

SPATIAL DIVERSIFICATION OF INDUSTRIES

(A STUDY IN UTTAR PRADESH)

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P r e f a c e

The present study attempts an empirical examination of the traditional theoretical propositions on industrial location and assessment of the impact of official and institutional efforts to bring about regional balance in industrial development. In the process the locational structure of industries in Uttar Pradesh has been examined in detail on the basis of secondary as well as primary data, and a number of policy implications, particularly concerning industrial development of backward areas, have been brought out. The study is, therefore, expected to be of interest to academics and policy makers alike.

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Chapter I

INTRODUCTION

The Problem

The theoretical analysis of the problems of location and spatial dispersal of industrial activities has been traditionally carried out on the basis of a relatively simple framework : natural endowment of a location as represented by the availability of basic raw materials, and nearness to the market are presumed to determine the spatial distribution of industrial activity. There are at least two important developments in the past decades that have necessitated a re-examination of location models based on this simple framework. These are : one, certain basic structural changes in the manufacturing activity, and two, emergence of policy considerations in favour of spatial balance in location of industrial activity.

Traditional theories of location and spatial diversification were formulated in a period when the industrial structures of most of the spatial units were still dominated by natural resource-based and directly consumer-oriented industries. The optimum location was simply determined by

the balance between location of raw material and market, on the one hand, and weight-distance characteristics of material and output, on the other. If the transport charges per unit of weight-distance did not significantly differ, as happened most of the time, the end-locations provided the optimum : the activities requiring weight losing materials got located at the raw material head and those requiring weight gaining material and careful and costly transport of final output got located nearer the market. Thus we have sugar factories located near sugarcane fields, and aerated soft drink plants located near the market. The changes in the structure of industries that have taken place, specially over the last half century, however, make it extremely difficult to classify them in terms of locational characteristics in the simple dichotomous scheme, and analyse them with the help of merely location and weight characteristics of raw material and market. First, the industrial structure has acquired an increasing proportion of such industries which are not predominantly natural resource and raw material-based. Second, processes of production have so changed that many units do not use nature-based raw material but semi-processed or intermediate products as the major input in

their production; while, therefore, a number of others does not produce for the final consumer, but only for other producers. Third, with the change in technology, organisation and size of production units, factors, such as infrastructure, power, cheap and 'submissive' labour force, finance etc., along with the supply of raw material and the market have become equally important, if not more. Fourth, the marketing system has also undergone changes with large scale production : a linear treatment of distance to market is too simplistic a tool to take care of the increasingly large number of space units providing the market; and many of the producers do not directly sell to the consumer. Therefore, what is of immediate importance is not the location of the market as such but availability of marketing arrangements and networks. Availability of transport facilities (not just the transport cost), infrastructure facilities, finance, industrial agglomerations to procure and sell intermediate products, and marketing network seem to have emerged as significant factors in location, sometimes overshadowing the importance of basic raw material and the location of the ultimate market.

The other significant development consists of the increasing concern of the policy makers for reducing regional disparities in levels of development and industrial activity which result from the unregulated operation of the location mechanism based on the resource endowment and nearness to market alone. The policy instruments have therefore been evolved to mitigate the disparate effects produced by free play of market forces. Industrial policy in India, for example, has emphasized this aspect continuously since mid-fifties. A panel appointed by the Government of India classified regions and districts of the country into industrially backward and non-backward ones and another panel recommended policy instruments, particularly in terms of incentives and subsidies to be offered to entrepreneurs who locate their units in backward areas. The Central and State governments have evolved a number of programmes and instruments to diversify industries in favour of backward areas. Location of some large public undertakings in backward regions, industrial estates programme, central capital subsidy, tax concessions, concessional terms of loan assistance and raw material and marketing assistance are some of the important instruments used for achieving the objectives of diversification and industrial development

of backward areas. Besides, the licensing authorities are also expected to consider backward area location as a favourable factor in deciding on licence applications.

Still, the traditional framework can take care of most of these complications to the extent the assumption, that an entrepreneur aims at profit-maximising location, holds good; and, whatever material and policy factors operate to ultimately affect either the revenue or cost or both in a location. Further, even the profit maximisation assumption cannot be taken for granted in an absolute sense, as there are non-economic reasons and constraints in operation. The entrepreneur may have his personal, non-pecuniary preferences for a location which is not necessarily the maximum profit location. There may be in operation certain policy instruments either inducing entrepreneurs to go to less favoured locations by offering pecuniary attraction or forcing them away from industrially developed areas by prohibiting installation of new units and expansion of old ones in such areas. In an economy primarily based on private enterprise, the policy instruments may have to be basically of a compensating nature : most of the time an entrepreneur may

have to be given adequate pecuniary compensation to mitigate the cost and profit disadvantage and loss of amenities of life that a particular less favoured location offers.

What is important, however, is that a larger number of variables than merely the location and weight characteristics of material and output, and location of market, need to be included in the explanatory framework. It is obvious ^{the proposition that} that the transport cost of material and output alone makes the difference is not valid, as even the 'ubiquities' are not always available at the same price due to differences in the demand-supply conditions of non-movable factors like land, and owing to the relative lack of mobility even among mobile factors like labour. On the other hand, certain materials, mainly universal intermediaries like cement and steel, sometimes assume the nature of 'ubiquities', as a result of the government policy of making them available at the same price irrespective of transport cost incurred to reach them at different locations.

The Present Study

An analytical framework to explain the pattern of industrial location needs, therefore, to be evolved through

indepth empirical studies, which could take care of the aforesaid/variables and propositions. There are two main inter-related issues which are of our concern in the present study of location of factories in Uttar Pradesh : (i) an examination of the adequacy of the traditional analysis of location to explain the pattern of industrial location; and (ii) an assessment of the impact of policy instruments on the pattern of industrial location in the State^{of Uttar Pradesh}. The vast geographical area of the State and extreme variations in levels of industrial activity, provide a good enough scope for examining the propositions outlined here. And extremely low levels of development, in general, in regions with very low levels of industrial activity makes such a study useful from policy viewpoint as well. Specifically, the study attempts (a) a portrayal of the spatial pattern of industries among various districts and regions; (b) an analysis of the pattern of location of new factories and employment added during 1960-75, in terms of certain characteristics of different districts, including indicators of institutional efforts made in this regard; (c) an analysis of entrepreneurs' motivation and perception in regard to locational decisions; (d) measurement of relative cost situation in

different districts and its relation with the incremental industrial activity; and (e) an examination of the extent of availment of institutional facilities and incentives and the entrepreneurs' knowledge and perception about them.

The analysis for (a) and (b), [reported in chapters II and III] has been conducted on the basis of secondary data. The details relating to the number of factories and employment were collected from the office of Chief Inspector of Factories, U.P., Kanpur and data relating to explanatory variables used in analysis were compiled from various published sources and concerned government offices. For (c) (d) and (E) ^{the subsequent}

[The information used in chapters IV, V and VI has] ^{information has} been collected from a sample of 292 factories spread in 15²² districts and 15 industrial groups, [as detailed in chapter IV (Table IV.1)]⁺ The procedure followed for sampling is briefly as follows : In the first instance, considering the time and resource constraints, it was decided to confine the survey to around 300 selected factories. Next, industry groups were selected on the basis of their importance in the State's industrial structure and location in at least 10 of the districts. The largest industry, sugar was left out for the reason that economics of its location is simple:

due to its high weight losing character it always gets located at the source of raw material. Cotton textile ^{was} ~~were~~ also left out as it has traditionally been concentrated in a few districts only. In the selection of industries, we intended to go into as disaggregated level as possible but, given the non-availability of necessary details regarding the specific products of factories before hand, and the necessity to have the selected industry at least in ten districts, we went upto 4-digit level in the Standard Industrial Classification. Once industries were selected on the above basis, the districts in which units in the selected industries were located got selected themselves. To begin with, a ten per cent sample on a proportionate probability basis was selected in each industry, with the proviso that a minimum of one unit is selected from a district, in order to ensure larger number of districts for an industry; but if a district gave only one or two units in the aggregate sample it was dropped. With all these adjustments a tentative sample of 485 factories got selected; but due to non-traceability, closure, shifting of location, non-response and incomplete information, the effective sample consisted of 292 units. A structured questionnaire was used for collecting information from the selected factories, which was personally administered by a team of investigators.

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Chapter II

SPATIAL STRUCTURE OF INDUSTRIES IN UTTAR PRADESH

The factory sector of the industrial economy of the State has experienced considerable growth during the last two decades. The number of factories has increased at an average annual rate of 5.48 per cent and that of factory workers, at 3.43 per cent during 1960-75. These compare favourably with the corresponding all-India figures of 6 and 2.5 per cent during this period. What is more significant to note, from the viewpoint of geographical diversification of industries in the State, is the fact that the structure of industries has experienced a change in favour of industries whose location is not heavily based on the availability of materials locally. There has been a relative decline in the employment share of industries not using locally produced material such as cotton textiles where it has declined from 37 to 31 per cent, and an increase in the share of capital and inter-

mediate products from 32 to 40 per cent. Among the important industries (contributing at least 2 per cent of employment), the fastest growth in factory employment has been experienced by units providing electrical machinery and apparatus, non-ferrous metal, chemicals and chemical products, iron and steel, metal products, pulp and paper board, rubber and plastic products and glass products, each having at least doubled its factory employment in 1975 over 1960.

Changes in Spatial Distribution

There, however, seems hardly any significant change in the overall spatial pattern of manufacturing activities in the State during this period. No doubt, the most industrialised district, namely, Kanpur now claims only 17 per cent of total factory employment in the State as compared to 26 per cent in 1960. But the gains of this relative decline have gone only to some other industrially better developed districts. So that the five districts with the largest factory employment in the State, namely, Kanpur, Meerut, Lucknow, Agra and Gorakhpur, alone had 57 per cent of the total employment in 1960 and 55 per cent in 1975.

Among themselves their relative positions have shifted; Lucknow and Meerut have gained, Kanpur and Gorakhpur have had a relative decline in their shares, and Agra has maintained its position with some improvement. At the bottom, the 10 industrially least developed districts namely, Rae Bareli, Pratapgarh, Ballia, Sultanpur, Jalaun, Tehri Garhwal, Hamirpur, Badaun, Garhwal and Banda together, shared 1.10 per cent of State's factory employment in 1960; in 1975 their share was reduced to 0.56 per cent. Over all, the Gini coefficient of district-wise distribution of factory employment worked out to 0.6787 in 1960 and 0.6806 in 1975.

It is also worthwhile to examine the distribution of industrial activity between the notified 'backward' districts and others. ⁴⁰ 39 of the 56 districts of the State are notified as industrially backward and six (seven) districts (Almora, Ballia, Basti, Faizabad, Jhansi including Lalitpur and, Rae Bareli) as specially backward. A number of concessions and incentives are available to units in these districts. Most of the term loans provided by the term lending institutions and also the State Government Sales Tax Refund Loans are available in backward districts on concessional terms. Exemption is also provided

from income tax, octroi duty, sales tax, electricity duty etc., under certain conditions and for a specific period of time. In specially backward districts, units are also eligible for an outright subsidy to the extent of 15 per cent of their capital investment from the Central Government. In view of all this it would be reasonable to expect that these districts would attract a larger percentage of incremental industrial activity than what they obtained in the base year.

This expectation is, however, not found to have been fulfilled. In fact, the position of the notified backward districts has somewhat deteriorated. Given the fact that almost three-fourths of the districts are in the backward category, a share as low as 18 per cent in factory units and 15 per cent in factory employment indicated a very high inequality of distribution of industrial activity across the districts in 1960. In 1975, the situation worsened as the share of these districts declined slightly in factory units and by over 2 per cent points in employment. The 'specially' backward districts experienced an increase in their employment share but it seems to have been contributed mostly by expansion in old units rather than due to the

Table II.1

Distribution of Activities Between Backward and
Non-backward Districts(%)

	<u>Factories</u>			<u>Factory Employment</u>		
	Back- ward Distts.	Specia- lly back- ward Distts.	Oth- ers	Back- ward Distts.	Specia- lly back- ward Distts.	Others
1960	17.77	2.79	82.33	15.34	3.21	84.66
1975	17.32	1.91	82.68	13.22	4.36	86.78
Share in increase during 1960-1975	16.97	0.87	83.03	9.14	6.59	91.86

establishment of new factories. It is interesting to note that the notified backward districts which have attracted a significant proportion (around 1% or more) of the new factories are not so backward and adjoin some industrially better developed districts as can be seen from Table II.2. In fact, 5 of the 8 such districts are in western U.P. a industrially better developed region generally. Thus, the major part of the new industrial activity ^{going} ~~resulting~~ to the group of backward districts, seems to have got concentrated in such backward districts which are in proximity of some better developed, non-

Table II.2

**Location of Backward Districts Claiming Significant
Number of Factories**

Backward Districts claiming significant % of new factories	% of new factories claimed	Bordering or neighbour- ing non-backward districts
1. Azamgarh	2.15	Gorakhpur, Varanasi
2. Unnao	2.01	Lucknow, Kanpur
3. Sitapur	0.98	Lucknow, Kheri
4. Etawah	0.90	Kanpur
5. Mathura	2.01	Agra, Aligarh
6. Moradabad	5.33	Meerut, Bareilly, Bijnor
7. Rampur	1.03	Bareilly, Nainital
8. Shahjahanpur	2.30	Bareilly, Kheri

backward districts. It appears that incentives and concessions tend to act as inducement more in such districts than in the really backward and remote districts, may be because the latter present a much more disadvantageous position than the backward districts in proximity to developed ones.

The highly uneven distribution of industrial activity among districts has roots in the historical evolution of industries in the past, particularly in the dominance of

raw material-based industries in the industrial structure and differences in the districts' endowments. Today, however, the State's industrial sector is very well diversified and a large part of its industrial activity is not necessarily based on local raw material or demand as such. The footloose industries which do not have any particular locational advantage in terms of raw material availability in one region as compared to others are the ones which have increased in relative importance over the last two decades. It is, therefore, disappointing to find that there has been no significant trend towards spatial diversification of manufacturing activity in the State.

That the State's industrial structure today has a high degree of locational flexibility is evident from the fact that of the 20 most important industries in the State, as many as 16 have their units located in more than 10 districts, mostly in different parts of the State. For example, spinning and weaving of textiles, the second largest factory industry of the State contributing around 15 per cent of employment in this sector, is located in as many as 27 districts spread over the entire State. The most important

industry, sugar, however, is a raw material-based industry, and does not provide much locational flexibility. Still it has factories in 35 districts, but employment in this industry in eastern districts has not kept up with the overall growth of industry in the State. Glass and glass products, another important and fast growing industry, has also its factories located in quite a few (15) districts. Among other important industries, repair of motor vehicles has factories in 42 districts, miscellaneous food products, in 38 districts; basic metals in 27 districts; metal products in 18 districts; electrical machinery in 15 districts; basic chemicals in 23 districts; and non-ferrous metal products in 18 districts. Thus, the State's industrial structure seems to have a good potential for locational diversification among various districts and regions.

Industrial Base and Specialisation of Districts

Before we attempt an analysis of factors responsible for leading to uneven distribution of new industrial activity, we would like to probe a little further into some aspects of locational structure of manufacturing activity in terms of districts' pattern of manufacturing activity and their industrial base and specialisation.

In the first instance, we tried to look at the specialisation pattern of districts, with the help of coefficients of specialisation for each district. Besides, indicating how different a district's industrial pattern is from that of the State as a whole, a comparison of coefficients for 1960 and 1975 also suggests whether the district's industrial pattern has become more diversified or concentrated over the period. The coefficient of specialisation for a district (S_j) is defined as:

$$S_j = \frac{\sum_{i=1}^n \frac{e_{ij}}{E_j} - \frac{E_i}{E}}$$

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where:

e_{ij} = employment in i th industry in j th district

E_j = employment in all industries in j th district

E_i = employment in i th industry in the State

E = employment in all industries in the State

When S_j is found to be 0, the district's industrial structure is as diversified as that of the State and when it is found approximately 1, the district's industrial employment is highly concentrated in only one or a few

industries. The computed coefficients of specialisation for each of the districts for 1960 and 1975 are given in Table II:3.

There is no reason to expect each of the districts to have factories in all of the State's industries and district's employment structure the same as of the State. In any case, a district's industrial structure cannot be any more diversified than the State's. The reason, however, as to why a diversified structure of a district is considered encouraging, lies in the fact that the industries have direct as well as indirect linkages with each other, and, therefore, existence of a larger number of directly or indirectly inter-connected industries is considered to provide a better potential for overall industrial growth of the district, than a narrow base consisting of one or a few district industries. Empirically also it has been found that districts with a diversified industrial structure are also the ones which have the highest level of industrial activity. In fact, this relationship is found to hold consistently across the districts in the State as is evident from a highly significant coefficient of correlation (-0.6694) between the coefficient of specialisation and number of factory workers in each district.

Table II:3

Extent of Industrial Diversification/Specialisation
of Districts in 1960 and 1975

District	S _j 1960	S _j 1975	District	S _j 1960	S _j 1975
Almora	0.7548	0.8123	Deoria	0.6148	0.6822
Pithoragarh	-	0.9730	Faizabad	0.3905	0.4825
Dehradun	0.2309	0.2205	Ghazipur	0.9413	0.8331
Garhwal	0.8835	0.5875	Gonda	0.5835	0.6979
Nainital	0.6308	0.5711	Gorakhpur	0.2053	0.3566
Tehrigarhwal	0.9563	0.9543	Jaunpur	0.5254	0.6150
Uttarkashi	-	0.9750	Mirzapur	0.6035	0.4815
Banda	0.9579	0.9895	Pratapgarh	0.5070	0.9298
Hamirpur	0.7133	0.9506	Sultanpur	0.9291	0.8639
Jalaun	0.9941	0.9777	Varanasi	0.5620	0.1211
Jhansi	0.4391	0.6634	Agra	0.1278	0.3294
Barabanki	0.9977	0.7184	Aligarh	0.3050	0.1967
Fatehpur	0.6404	0.8847	Bijnor	0.3379	0.4316
Hardoi	0.7479	0.7971	Badaun	0.6675	0.6438
Lucknow	0.5171	0.2227	Bareilly	0.1932	0.3857
Kanpur	0.3551	0.1015	Bulandshahr	0.6840	0.6627
Rae Bareilly	0.9705	0.7552	Etah	0.6791	0.6024
Sitapur	0.6017	0.3943	Etawah	0.8366	0.8319
Unnao	0.8135	0.4382	Farrukhabad	0.5845	0.4920
Kheri	0.7748	0.7766	Mainpuri	0.8243	0.7629
Allahabad	0.4914	0.3710	Mathura	0.1416	0.4808
Azamgarh	0.6563	0.5504	Meerut	0.1285	0.0053
Bahraich	0.4660	0.6698	Moradabad	0.4719	0.1393
Ballia	0.6986	0.9302	Muzaffarnagar	0.5846	0.4182
Basti	0.4881	0.5681	Rampur	0.8076	0.4520
Pilibhit	0.7481	0.7866	Saharanpur	0.2799	0.2874
			Shahjahanpur	0.5168	0.6602

Most of the districts of the State, however, show a highly concentrated rather than diversified pattern of factory employment among industries. All the Hill districts (except Dehradun), all the districts in Bundelkhand, most of the districts in Central region (except Lucknow, Kanpur, Unnao and Sitapur), all Eastern districts (except Allahabad, Gorakhpur and Varanasi) have coefficients of specialisation higher than 0.5; 11 of 18 Western districts, however, show a more diversified pattern with $S_j < 0.5$. On the whole there seems to have occurred a decline in disproportionate specialisation over the period 1960-75 in most of the districts, as shown by generally a lower value of S_j in 1975 as compared to 1960. Bundelkhand districts, however, have revealed a reverse trend. So have a number of districts in Eastern region, viz., Baharaich, Ballia, Basti, Deoria, Faizabad, Gonda, Gorakhpur, Jaunpur and Pratapgarh. The districts which have achieved a substantial degree of diversification over the period are : Lucknow, Kanpur, Unnao, Varanasi, Meerut and Moradabad. Agra, Bareilly and Mathura, on the other hand, seem to have developed a more concentrated structure of factory employment over the period.

While districts with less diversified structure have only a few industries which could be considered their industrial base, even the districts with relatively diversi-

fied structure cannot claim to have all the industries in which factories are located in their jurisdiction as their industrial base. In a general sense, the industrial base of a region is defined in terms of the industries in which a district has relatively higher level of activity, let us say, more than proportionate share of employment. We would try to examine this aspect with the help of location quotients. Location quotient for an industry in a district is defined as:

$$l_{ij} = \frac{e_{ij}}{E_j} \bigg/ \frac{E_i}{E}$$

the various terms representing the same variables as in case of coefficient of specialisation. Industries with $l_{ij} > 1$ in any district are supposed to constitute the industrial base of that district. On this basis industries which constitute industrial base of various districts in the State are listed below (figures in brackets are value of l_{ij}).

Table II : 4
Industrial Base of Districts in Uttar Pradesh

Districts	Industries with $l_{ij} > 1$
Almora	Miscellaneous food preparations(7.8), Wood and Cork (4.07), Miscellaneous chemical products (47.7).
Pithoragarh	None

**Industrial Base of Districts in
Uttar Pradesh
(contd.)**

Districts	Industries with $\bar{x} > 1$
Dehradun	Miscellaneous food preparations (4.50), manufacture of wood and cork (3.22), printing, book binding etc. (4.02), basic chemical products (3.51), electrical machinery (3.48); repair of motor vehicles and cycles (1.96), scientific instruments (7.19), jewellery and related articles (2.30).
Garhwal	Grain mill products (13.21), miscellaneous food preparations (2.199), boots and shoes (17.43); rubber and rubber products (15.37), musical instruments (30.62).
Nainital	Dairy products (52.00), canning and preservation of fruits and vegetables (9.75), grain mill products (2.73), sugar (2.19), miscellaneous food preparations (6.97), wearing apparels (6.12), wood and cork (3.45), miscellaneous chemical products (6.54), repair of motor vehicles and cycles (3.70).
Tehri-Garhwal	Printing, book binding (2.188)
Uttar Kashi	Electrical machinery (40.00)
Banda	Grain mill products (9.52).

Industrial Base of Districts in Uttar Pradesh
(contd.)

Districts	Industries with $f_{ij} > 1$
Hamirpur	Repair of motor vehicles and cycles(20.24)
Jalaun	Pulp paper and paper board (74.22), rubber and rubber products (15.33).
Jhansi	Miscellaneous chemical products (1.24), structural clay products (30.50), miscellaneous nonmetallic mineral products(5.78), railroad equipment (manufacturing and repair) (5.78), repair of motor vehicles and cycles (9.42).
Fatehpur	Grain mill products (41.08), miscellaneous food products (2.66), vegetable and animal oil (10.60), iron and steel (10.23).
Hardoi	Sugar (4.43).
Lucknow	Grain mill products (2.00), distilling, rectifying and blending of spirits (5.12), wine (1.62), cordage, rope and twine (1.85), wearing apparel (1.00), printing, book-binding etc.(4.8), leather and tanneries, chemical products (1.65), other non-metallic mineral products (3.12), metal products(1.33), manufacture and repair of railroad equipment (4.72), motor vehicle (5.72), repair of motor vehicles and cycles (1.58), scientific instruments (2.29).

**Industrial Base of Districts in Uttar Pradesh
(contd.)**

Districts	Industries with $\text{fig} > 1$
Kanpur	Grain mill products (1.27), bakery products (2.58), soft drinks and carbonated water (1.25), tobacco products (4.03), spinning, weaving and finishing of textiles (119.70), knitting mills (1.67), cordage, rope and twine (1.20), weaving apparel (2.75), tanneries and leather finishing (4.88), rubber products (2.24), chemicals (1.46), motor vehicles (2.81), bicycles (1.36), scientific instruments (1.05), photographic and optical goods (1.00).
Rae Bareilly	Spinning, weaving, and finishing of textiles (2.57), cordage, rope and twine (37.19), wood and cork products (12.40), non-metallic mineral products (5.87), metal products (1.33), electrical machinery (10.96).
Barabanki	Sugar (3.19), basic chemicals (12.59), miscellaneous chemical products (1.66), non-metallic products (6.36).
Sitapur	Grain mill products (1.47), bakery products (2.79), miscellaneous food products (6.25), cordage, rope and twine (2.27), wood and cork products (53.30).

Industrial Base of Districts in Uttar Pradesh
(contd.)

Districts	Industries with $\text{ij} > 1$
Unnao	Distilling, rectifying and blending of spirits (12.98), tobacco manufacture (3.01), manufacture of boots and shoes (29.12), furniture and fixtures (13.17), pulp paper and paper board (1.54), tanneries and leather finishing (12.42), rubber products (1.36), basic chemicals (12.27), vegetables and animal oil (12.00), chemical products (1.48), non-metallic mineral products (3.16), iron and steel (3.61), musical instruments (2.92).
Kheri	Sugar, sugar confectionary (349.00).
Allahabad	Canning and preservation of fruits and vegetables (13.90), bakery products (4.21), spinning weaving and finishing of textiles (1.16), furniture and fixtures (1.73), pulp paper and paper board (1.46), printing, book binding etc. (3.87), rubber products (1.22), chemical products (2.31), non-metallic mineral products (2.52), machinery (1.18), electrical machinery (10.99), scientific instruments (2.09), jewellery and related articles (10.00).
Azamgarh	Spinning, weaving and finishing of textiles (4.09), repair of motor vehicles and cycles (1.32).

**Industrial Base of Districts in Uttar Pradesh
(contd.)**

Districts	Industries with $\text{fig} > 1$
Bahraich	Grain mill products (18.76), sugar (2.03), miscellaneous food products (2.94), cement (17.82), repair of motor vehicles and cycles (3.51).
Ballia	Miscellaneous food products (17.05), repair of motor vehicles and cycles (13.20).
Basti	Canning and preservation of fruits and vegetables (15.50), bakery products (43.67), sugar (3.91).
Deoria	Sugar (4.78), distilling, rectifying and blending of spirits (3.53).
Faizabad	Sugar (1.64), miscellaneous food products (1.31), spinning, weaving and finishing of textiles (1.76), wood and cork (4.28), pulp paper and paper board (6.47).
Ghazipur	Pottery, china and earthenware (184.00).
Gonda	Grain mill products (2.00), sugar (3.70), distilling, rectifying and blending of spirits (13.21), wines (15.23), wood and cork (7.75).
Gorakhpur	Sugar (1.85), printing, book-binding etc. (21.15), basic chemicals including fertilisers (10.95), iron and steel (1.00).

Industrial Base of Districts in Uttar Pradesh
(contd.)

District	Industries with $\bar{x} > 1$
Jaunpur	Bakery products (4.71), sugar (2.38), miscellaneous food products (4.68), basic chemicals (1.47), iron and steel (2.86), machinery (1.56), repair of motor vehicles and cycles (3.41).
Mirzapur	Basic chemicals (1.54), cement (29.49), non-metallic mineral products (1.41), non-ferrous metal and metal products (23.57).
Pratapgarh	Miscellaneous food products (14.56), repair of motor vehicles and cycles (14.23).
Sultanpur	Wood and cork (36.68), iron and steel (1.32), metal products (3.56), repair of motor vehicles and cycles (13.36).
Varanasi	Bakery products (1.13), soft drinks and carbonated water (1.75), knitting mills (8.59), cordage, rope and twine (8.00), weaving apparel (3.88), basic chemicals (4.71), nonmetallic mineral products (1.56), machinery (3.14), electrical machinery (2.41), railroad equipment (2.96), repair of motor vehicles and cycles (1.03), manufacture of bicycles (2.94), scientific instruments (7.05).
Agra	Miscellaneous food products (1.71), soft drinks and carbonated water (1.125), knitting mills (4.00), miscellaneous textiles (2.00), boots and shoes (1.87), furniture and fixtures (1.87), glass and glass products (7.79).

**Industrial Base of Districts in Uttar Pradesh
(contd.)**

District	Industries with $\{I_j > 1$
Aligarh	Dairy products (4.19), grain mills products (1.11), miscellaneous food products (3.44), printing, publishing and book-binding (2.27), vegetable and animal oils (5.00), metal products (3.92), aircraft manufacture (27.70), musical instruments (7.04).
Bijnor	Sugar (4.28), wood and cork (1.53), repair of motor vehicles and cycles (1.52).
Badaun	Sugar (1.52), miscellaneous food products (6.19), pulp paper and paper board (18.35), basic ferrous metals (4.60), repair of motor vehicles and cycles (3.05).
Bareilly	Sugar (1.05), miscellaneous food products (2.82), distilling, rectifying and blending of spirits (1.28), soft drinks, and carbonated water (12.25), wood and cork (1.70), printing, bookbinding etc. (3.91), machinery (1.54), railroad equipment (3.87), repair of motor vehicles (1.11).
Bulandshahr	Sugar (2.67), miscellaneous food products (2.59), rubber and rubber products (2.89), chemical products (6.59), repair of motor vehicles and cycles (2.59).
Etah	Dairy products (9.54), grain mill products (1.33), sugar (3.11), miscellaneous food products (1.75), chemical products (2.63), metal products (1.30), repair of motor vehicles and cycles (1.48).

**Industrial Base of Districts in Uttar Pradesh
(contd.)**

District	Industries with $\text{I.I.} > 1$
Etawah	Grain mill products (34.64), miscellaneous food products (1.61), tobacco products (16.26), chemical products (2.13), repair of motor vehicles and cycles (1.10).
Farrukhabad	Sugar (2.09), miscellaneous food products (13.14), tanneries and leather finishing (2.35), basic metals (1.79), repair of motor vehicles and cycles (1.85).
Mainpuri	Grain mill product (8.97), miscellaneous food products (2.16), pulp paper and paper board (3.21), vegetable and animal oil (2.67), electrical machinery (23.30), repair of motor vehicles and cycles (1.33).
Mathura	Grain mill products (5.66), miscellaneous textiles (138.50), pulp paper and paper board (2.12), printing, book-binding etc., (1.02), basic chemicals including fertilisers (1.28), chemical products (1.67), pottery, china and earthenware (6.33), other non-metallic mineral products (33.59), basic metals (2.08), non-ferrous metals (9.85), metal products (3.42), machinery (2.42), repair of motor vehicles and cycles (1.06).
Meerut (including Ghaziabad)	Canning and preservation of fruits and vegetables (2.05), miscellaneous food products (1.27), breweries and incidental processes (5.17), soft drinks and carbonated water (1.81), spinning,

**Industrial Base of Districts in Uttar Pradesh
(contd.)**

District	Industries with $\bar{x} > 1$
	weaving, and finishing of textiles (1.58), pulp paper and paper board (2.16), rubber and rubber products (4.05), chemical products (1.67), Pottery, china and earthenware (2.23), basic metals (1.67), machinery (3.42), electrical machinery (1.36), manufacture of bicycles (4.04), watches and clocks (6.71), jewellery and related articles (4.10), musical instruments (4.00).
Moradabad	Dairy products (2.05), sugar (3.35), non-ferrous metals (2.30), metal products (1.62), aircraft manufacture (19.90).
Muzaffarnagar	Dairy products (1.44), sugar (3.94), distilling rectifying and blending of spirits (2.14), vegetable and animal oils (10.00), basic metals (1.90).
Rampur	Sugar (3.00), cordage, rope and twine (3.85), chemical products (8.58), non-metallic mineral products (1.50).
Pilibhit	Grain mill products (1.07), sugar (4.87).
Saharanpur	Dairy products (10.50), sugar (1.34), wine (24.00), tobacco products (2.42), knitting mills (2.00), pulp paper and paper board (6.04), vegetable and animal oils (3.47), non-metallic mineral products (1.25), machinery (7.06), railroad equipment (2.38), Photographic and optical goods (4.00).

Industrial Base of Districts in Uttar Pradesh
(contd.)

District	Industries with $lij > 1$
Shahjahanpur	Grain mill products (1.63), sugar (4.10), miscellaneous food products (2.37), distilling, rectifying and blending of spirits(15.81).

The foregoing list of industries and their location quotients for different districts needs to be read carefully. Obviously, it does not mean that industries not mentioned in the list do not exist in a district, nor does it imply that industries mentioned are the largest ones in the district. Location quotient is a highly relative measure of specialisation, and when it is more than one for an industry in a district, as is the case of the industries in each district listed above, it only implies that the industry has a higher proportion in the district's industrial employment than it has in the State's industrial employment. A large number of industries with higher than one location quotient does not necessarily imply anything desirable or undesirable for a district. In fact, districts with highly diversified structure do not show a very high value of location quotient for specific industries, even though it may contribute a significantly high proportion of the State's industrial employment in each of them.

Industries with a higher than one location quotient are taken to constitute the industrial base of a region for the simple reason that a higher proportion of such industries within a region's industrial structure implies higher than average weightage of those industries in the district which might imply some locational advantage. Therefore, from a policy viewpoint, it is considered desirable to start with an emphasis on these industries, if the region's industrial development is to be accelerated. This approach also recognises the need for specialisation and futility of efforts to develop a highly diversified industrial structure at the level of micro-regions. It has much to commend itself at the level of district where attempt to develop all types of industries may not be meaningful and, therefore, a selective approach has to be adopted.

Locational Linkages Among Industries

The approach, however, becomes more effective if the clusters of industries constituting the industrial base of a region do not merely reflect the co-existence of various industries based on coincidental or historical circumstances, but also consist of sets of technologically inter-linked industries. On the basis of the generally *observed* pattern of inter-industry linkages, one could broadly

identify the following groups each consisting of industries with possibilities of mutual input and market linkages:

- (i) Food processing industries (excluding sugar)
- (ii) Sugar, gur, etc., and beverages.
- (iii) Textile-based industries.
- (iv) Leather-based industries.
- (v) Forest-based industries.
- (vi) Chemical and chemical-based industries.
- (vii) Non-metallic mineral products group
- (viii) Metals, machinery, instruments and transport equipment.

For achieving rapid industrial development simultaneously with better inter-regional spread of industrial activity, identification of technologically-linked clusters of industries and planning to develop them area-wise is one of the most suitable approaches. While certain districts and areas seem to have already ^{developed} industrial base around such clusters, the necessary links are missing in a number of others. A tentative effort based on the limited data and exercise given in preceding pages results in the identification of the following pattern of such clusters in various districts and regions:

1. Among the eight districts of the Hill region, the only somewhat developed clusters are: food processing industries group in Nainital and a somewhat loosely connected group of metals and machinery products in Dehradun. While most of the districts in this region have demonstrated some potential for development of food processing, forest-based products and chemical products groups, there do not seem to have developed a complex of mutually linked industrial units in these potential groups of industries.
2. Bundelkhand's industrial activity in the factory sector does not suggest the realisation of any of clusters, although a few industries in which the region seems to have relative specialisation, such as in the chemical group and machinery group in Jhansi, food group in Banda and rubber and plastics in Jalaun have potential of backward and forward linkages to develop other related industries.
3. In the central region, Kanpur obviously has a strong textile based cluster, another based on metal and machinery group and also one based on leather. A plastic-cum-chemical cluster is also visible, even though in an embryonic form. Unnao shows a very well developed cluster of

chemical-based and another of forest-based industries. Lucknow seems to have developed a base on transport equipment group of industries. Sitapur shows potential for developing a complex around food products group; and so does Kheri, to some extent. Rae Bareilly's industrial base suggests two clusters; textile-based and metal-based; both being in embryonic stage at the moment. The same can be said about a food products-based cluster in Fatehpur.

4. Eastern Uttar Pradesh districts seem to have potential for developing quite a few inter-related groups of industries. But only some of them are on the way of growing; food products group in Allahabad, Basti, Gonda, and Jaunpur; textile-based cluster in Varanasi; forest products-based group in Allahabad and metal-based clusters in Allahabad and Varanasi. The following clusters exist in an embryonic form : food products group in Bharaich and Faizabad; textile-based group in Allahabad and Azamgarh; forest-based group in Faizabad, Gonda and Sultanpur; chemical group in Gorakhpur, Jaunpur, Mirzapur and Varanasi, and metal products group in Sultanpur and Jaunpur. In western Uttar Pradesh the most well developed clustering is around metal products and machinery in Meerut, Mathura, Saharanpur and Bareilly; food products group in most of the districts; textile-based group in Agra and Saharanpur; forest-based cluster of industries in Bareilly and Saharanpur.

Chapter III

FACTORS IN LOCATION : SOME MACRO-VARIABLES

Turning to the analysis of the pattern of location of the incremental industrial activity during the years 1960-75 we start with the simple proposition that the new industrial activity tends to get located where industries already exist. The proposition may be tested both at all industry and individual industry level. If validated, this hypothesis leads to somewhat discouraging implications regarding diversification and calls for a planned big push as the only solution to the development of industrially backward areas; incentives and subsidies, and success in locating one or few units would hardly produce any effect. We have attempted to verify this hypothesis by correlating the factory employment in 1960 with the increase that took place during 1960-75, in each of the districts. The analysis attempted is for total industrial employment and also for each of such 13 important industries which are spread over at least 10 districts.

The coefficients of correlation between the base year and incremental factory employment are presented in Table III:5.

The distribution of total increase in factory employment across districts is related, though weakly, with the distribution that existed in 1960. It implies that to a certain extent incremental industrial activity has tended to go to districts with already relatively high level of industrial employment. But the relationship does not hold in case of individual industries: in 12 out of 13 industries considered here the additional employment did not get distributed in the pattern obtaining in 1960, and in the case of textiles and repair of motor vehicles and cycles, it is highly significantly different. The only industry where the distribution of incremental employment had a significantly similar pattern with that of 1960, is the manufacture of miscellaneous food products.

Overall, therefore, the hypothesis that new factories and employment in an industry tend to go to districts where units in that industry already exist does not hold in case of most of the industries, which augurs well for

Table III:1

Relation Between Base and Incremental Industrial
Employment

Industry group	r between E. 1960 & Δ E 1960-75	N
All industries	0.35*	51
206 Manufacture of bakery product	0.39	13
207 Sugar factories and refineries	0.21	34
209 Manufacture of miscellaneous food preparations	0.38*	39
231 Spinning, weaving and finishing of textile	-0.79**	25
233 Cordage, rope and twine industries	-0.18	15
300 Rubber and rubber products	-0.09	17
311 Basic chemicals including fertiliser	-0.04	23
319 Manufacture of chemical products	-0.14	29
341 Ferrous--manufacture of iron and steel	0.17	27
342 Non--ferrous--melting and refining of metals	0.06	18
350 Manufacture of metal products	0.26	25
370 Manufacture of electrical machinery, appliance etc.	0.09	14
384 Repair of motor vehicles and cycles	-0.72**	41

Note : * Significant at 5 per cent level

** Significant at 1 per cent level

Others not significant

the possibility of diversification of manufacturing activities and industrial development of backward areas. We, however, find that when all industries are taken together the hypothesis holds, though weakly.

Let us, therefore, now examine a related hypothesis: industrial units in an industry tend to go to locations where related industries with linkage potential already exist. We have attempted to examine this relationship in the case of four sets of interrelated industries : food products group, textiles, chemicals, and metal based group. The only relationships that turned out significant are the following:

Table III:2

Locational Inter-relationships Among Industries

E 1960 in 209 with Δ E 1960-75 in	206	r = 0.75
231	239	r = 0.99
319	300	r = 0.63
342	370	r = 0.74
384	341	r = 0.96
384	350	r = 0.98
384	370	r = 0.44

The results of the exercise read with those reported in Table III:2 suggest that expansion of an industry is more often related with the base of the related industries, than its own importance in a region. But this relationship is also found operative only in a few cases. To a certain extent it may be a reflection of the very nature of industrial structure in the State : dominance of industries of autonomous type without much forward and backward linkages. But still, some of the relationship seem highly meaningful. For example, location of new activity in the manufacture of miscellaneous textile products is highly positively associated with the level of activity in the spinning, weaving and finishing of textiles in the base year. Similarly, in the manufacture of electrical machinery, apparatus, appliances etc., the new activity has got located in different districts in line with the base of melting and refining of the nonferrous metals. The base of repair activities is found very closely related with the new activity in basic metals and metal products. In the food products groups, bakery products and miscellaneous food preparations have gone together; while rubber products and chemical products have formed another pair of industries with closely associated locations.

This aspect of locational structure, however, needs to be investigated in greater detail with a view to indentifying a larger number of operational and potential associations and clusters, and the nature of their associations-forward or backward linkages or reliance on some common inputs available in a region. Such identification of clusters and catalytic industries may be of great help in locational planning of industrial activity.

District Characteristics and Location

A detailed analysis of factors in location of specific industries in terms of the variables affecting costs, prices and other-relevant inputs for location decisions, as well as of the locational linkages among industries, is ~~planned to be~~ ^{later} carried out on the basis of the primary data ~~currently being~~ collected from a sample of factories in different industries and districts. A preliminary analysis based on some overall characteristics of different districts is undertaken here as an attempt to explain the spatial distribution of incremental industrial activity. The factors chosen are meant to represent the demand and raw material situation, infrastructure, and

efforts made by public institutions to develop industries in different districts. Value of agricultural production per person is assumed to reflect the local demand for industrial products as well as the raw material base. Road mileage per 1000 square kilometers of area, population per bank office, and electricity consumption are taken to represent the general level of infrastructure development. Loans and investments made by promotional and financial institutions such as U.P. State Industrial Development Corporation (UPSIDC), U.P. Financial Corporation (UPFC), and Pradeshia Industrial and Investment Corporation of Uttar Pradesh (PICUP) are taken as indicators of official efforts to develop industries in different districts. Multiple regression and partial correlation analysis have been carried out with the above as independent variable and number of factories and employment added in all industries together, and additional factory employment in each of the 12 selected industries in various districts as the dependent variables. The results of the analysis are reported in Table III:3.

The results of the regression analysis show an overall high explanatory power of the model in most of the cases, and most of the coefficients are also found to be significant.

Table LII:3

Results of Regression Analysis

Y	Constant	Coefficients of independent variables					R2
		X ₁	X ₂	X ₃	X ₄	X ₅	
1	2	3	4	5	6	7	8
1. Factories added during 1960-75 All Industries (Δ F 1960-75)	- 75.37	+ 20.37* (0.598)	+ 0.45* (0.014)	- 0.54* (0.014)	+ 0.17 (0.004)	+ 0.11 (0.019)	0.9814
2. Factory employment added during 1960-75 : All Industries (Δ E 1960-75)	- 596.86	+ 600.77* (104.60)	+ 28.10* (2.51)	- 77.59* (7.15)	+ 6.30* (0.663)	+ 11.94* (3.40)	0.8768
3. Δ E 1960-75 Industry : 2097 Sugar	- 7529.06	+ 1538.61* (10.47)	+ 35.28* (0.244)	+ 6.09* (0.74)	- 3.45* (0.057)	+ 21.10* (0.47)	0.9902
4. Δ E 1960-75 Industry : 209 Misc. food products	- 66.20	+ 77.69* (0.30)	+ 0.32 (0.19)	- 2.40* (0.58)	- 0.12 (0.044)	- 0.57 (0.226)	0.7611
5. Δ E 1960-75 Industry : 231 Textile Weaving Spinning etc.	- 10142.40	+ 1177.45* (109.11)	+ 38.87* (2.26)	+ 59.48* (7.26)	+ 1.12 (0.45)	+ 2.17 (2.33)	0.7885
6. Δ E 1960-75 Industry : 233 Cordage, rope and Twine Industries	1056.40	- 113.91* (2.97)	- 1.86* (0.058)	- 13.91* (0.257)	- 0.03* (0.009)	- 0.06 (0.52)	0.9732
7. Δ E 1960-75 Industry : 300 Rubber and rubber products	256.62	136.03* (0.82)	- 4.39 (0.018)	- 9.81 (0.756)	+ 1.05 (0.003)	+ 0.05 (0.018)	0.9728

Results of Regression Analysis (contd.)

1	2	3	4	5	6	7	8
8. ΔE 1960-75 (Industry : 311 Basic Chemicals including fertilizers	1263.96	- 219.08* (27.39)	- 3.59* (0.528)	- 3.43 (2.15)	+ 0.13 (0.105)	+ 0.57 (0.54)	0.6817
9. ΔE 1960-75 (Industry : 319 Misc. Chemical products	- 71.26	+ 55.61* (4.73)	+ 0.378* (0.106)	- 2.301* (0.371)	+0.416* (0.023)	-0.186 (0.118)	0.9383
10. ΔE 1960-75 (Industry : 341 Iron and Steel	-2308.83	+ 381.55* (9.68)	5.30* (0.204)	+14.41* (0.759)	+ 2.32* (0.436)	+0.001 (0.242)	0.9894
11. ΔE 1960-75 (Industry : 342 Non-ferrous metal melting & refining	-2302.42	+ 386.72* (7.03)	+ 3.85* (0.138)	+13.42* (0.492)	- 0.32* (0.024)	+13.00 (0.136)	0.9968
12. ΔE 1960-75 (Industry : 350 Metal products	-1402.53	+ 156.02* (6.99)	+ 2.99* (0.16)	+ 8.22* (0.583)	+ 2.30* (0.030)	+ 0.86* (0.155)	0.9948
13. ΔE 1960-75 (Industry : 370 Electrical Machi- nery apparatus, appliances, etc.	- 435.26	- 45.36 (34.68)	+ 1.18 (0.709)	+11.53* (2.95)	+ 1.49* (0.130)	+ 0.12 (0.67)	0.9964
14. ΔE 1960-75 (Industry : 384 Repair of motor vehicles and motor cycles	-4131.85	- 531.15* (23.92)	8.13* (0.533)	-29.13* (1.623)	- 2.23* (0.133)	- 2.59* (0.68)	0.9103

Note : X_1 = Value of agricultural production per person 1970-71 (Rs. 900); X_2 = Road mileage per 100 sq. km. area 1970-71 (K.M.); X_3 = Population per commercial bank office 1973 (1000); X_4 = Loans and investments by financial institutions (UPSIDC, UPFC and PICUP) 1980-75 (Rs. lakhs); X_5 = Electricity consumption per head 1970-71 (in KW)

* Significant at 90 per cent or higher level of confidence.

It is found that the inter-district variations in the number of new factories established and employment added in all industries during 1960-75, are quite well explained by the macro-characteristics of the districts selected for analysis. A unit (Rs.100) variation in value of per capita agricultural production is found to be associated with 20 units variation in factories and 600 unit variation in employment. A difference of one kilometer of road per 1000 of population has been accompanied by a variation of 0.45 of factory and 28 persons in employment. The bank office variable is negatively specified in terms of population ('000) per bank branch and, therefore, its coefficient has a negative sign; its values are significantly associated with incremental industrial activity, as reduction by 1000 is associated with the location of half a new factory and increase in factory employment by 78 persons. A higher investment by public institutions of Rs.1 lakh in one district than in another, brings about a difference of 0.17 of a factory and 6 workers. Similarly if electricity consumption changes by 1 KW per person from one district to another, it is associated with a difference of 0.11 of a factory and employment ^{of} 12 persons.

The value of agricultural production per person is found to be associated with the addition in factory employment in the case of most of the selected industries also. In a few industries ~~sample~~ : (cordage, rope and twine industries; basic chemicals and repair of motor vehicles), however, the coefficients have a significant and negative value. No logical explanation could be given for this: the location of new factories and employment in these industries may well not be related with the level of agricultural development, but there is no reason to believe that it has an inverse causal relation. Similar is the case of road mileage in the equation for cordage, rope and twine, basic chemicals; of banking facilities in the equations for textile weaving, spinning etc., iron and steel, non-ferrous metals, metal products and electrical machinery; of institutional finance in case of sugar, cordage, rope and twine, miscellaneous chemical products, and repair of motor vehicles and motor cycles, the results are contrary to expectations, and can only be explained in terms of the inadequacy of the model. These cases may be investigated at a later stage on the basis of more specific variables.

Overall, the variations in agricultural development seem to explain a large part of the inter-district variations

in the location of incremental industrial activity. It must, however, be kept in mind that the large values of the coefficients of this variable reflect the unit used in specification (Rs.'00) and its relatively low variation as compared to the dependent variable. Transport facilities, represented by road mileage, is again found to have a strong effect; it is found to be particularly high in case of sugar, and textile industries and quite low in miscellaneous food products and miscellaneous chemical products. Banking facilities are found to have a substantial effect on overall industrial activity, but their effect is found particularly notable in sugar, cordage, rope and twine, rubber and rubber products, and repair of motor vehicles and motor cycles. Institutional financing seems to have contributed significantly, particularly in case of basic metals and engineering industries.

It is interesting to note, however, that while the contribution of each of these variables is quite significant in combination with each other, it pales into virtual insignificance when variables are considered singly, Partial correlation coefficients, measuring the contribution of variable keeping the others constant, turn out to be insignificant in most of the cases (Table III:4). The only

Table III:4

Partial Correlation Coefficients

Y	$YX_1 \cdot X_2$	$YX_2 \cdot X_1$	$YX_3 \cdot X_1$	$YX_4 \cdot X_1$	$YX_5 \cdot X_1$
	X_3, X_4, X_5	X_3, X_4, X_5	X_2, X_4, X_5	X_2, X_3, X_5	X_2, X_3, X_4
1	2	3	4	5	6
1. Factories added during 1960-75 : All Industries ($\Delta F1960-75$)	+ 0.2572	+ 0.2829	- 0.1610	+ 0.8006*	+ 0.1621
2. Factory Employment added during 1960-75: All Industries ($\Delta E1960-75$)	+ 0.0721	+ 0.1687	- 0.2092	+ 0.4361*	+ 0.1627
3. $\Delta E1960-75$ Industry : 207 Misc. Sugar	+ 0.7040	+ 0.7793	- 0.0820	- 0.8600*	+ 0.6212
4. $\Delta E1960-75$ Industry : 209 Misc. Food products	+ 0.1518	+ 0.0271	- 0.1107	- 0.1633	- 0.1441
5. $\Delta E1960-75$ Industry : 231 Textile Weaving, Spinning etc.	+ 0.2317	+ 0.3195	+ 0.2741	+ 0.1861	+ 0.0611
6. $\Delta E1960-75$ Industry : 233 Cordage, rope and Twine industries	- 0.5217	- 0.2788	- 0.5508	- 0.1447	- 0.1884
7. $\Delta E1960-75$ Industry : 300 Rubber and Rubber products	+ 0.5485	- 0.6984	- 0.5377	+ 0.9814*	+ 0.0488

Partial Correlation

	1	2	3	4	5	6
8. Δ E1960-75 Industry : 311 Basic chemicals including ferti- lizers		- 0.2227	- 0.1645	- 0.0614	+ 0.1193	0.0858
9. Δ E1960-75 Industry : 319 Misc. Chemical products		+ 0.1978	+ 0.0632	- 0.1751	+ 0.7226*	- 0.0819
10. Δ E1960-75 Industry : 341 Iron and steel		+ 0.3994	+ 0.2498	+ 0.2860	+ 0.8832*	+ 0.0368
11. Δ E1960-75 Industry : 342 Non-ferrous metal melting and refining		+ 0.5281	+ 0.2419	+ 0.3926	- 0.3799	+ 0.9402*
12. Δ E1960-75 Industry : 350 Metal products		+ 0.2106	+ 0.1615	+ 0.1677	+ 0.9205*	+ 0.1471
13. Δ E1960-75 Industry : 370 Electrical Machinery Apparatus, appliances etc.		- 0.0326	+ 0.0334	+ 0.1233	+ 0.6509*	+ 0.0120
14. Δ E1960-75 Industry : 384 Repair of Motor vehicles and motor cycles		- 0.3015	- 0.2154	- 0.3575	- 0.6556*	- 0.1718

Note : X_1 = Value of agricultural production per person 1970-71 (Rs. 900); X_2 = Road mileage per 1000 sq.KM area (1970-71 (K.M.)); X_3 = Population per commercial bank office 1977-78 (1000); X_4 = Loans and investments by financial institutions (UPSIDC, UPFC and PICUP) upto 1975 (Rs. lakhs); X_5 = Electricity consumption per head 1970-71 (in KW).
* Significant at 90 per cent or higher level of confidence.

variable which gives significant partial correlation coefficient, at least in some cases, is the institutional finance. In case of overall distribution both of added factories and employment, the loans and investments made by State level institutions explain a significant extent of inter-district variations, even when the influence of other variables is ignored. Similar tendency is found to prevail in case of some individual industry groups : rubber and rubber products, basic metals (iron and steel), metal products, chemical products and electrical machinery.

The broad conclusion that emerges from the foregoing analysis is that the macro-variables relating to levels of agricultural development, infrastructure and special efforts made by public institutions, by and large, explain the inter-district variations in location of economic activity significantly. It, however, looks that their influence is much better felt if applied in combination. Special promotional and financial efforts by public institutions, however, seem to make their results felt to a certain extent, irrespective of other macro-characteristics of the districts, particularly in case of modern foot-loose industry, not based on specific local raw material.

Chapter IV

FACTORS IN LOCATION : ENTREPRENEURS' PERCEPTION

In the previous chapter we looked into some of the important characteristics of districts that tend to favour location of industries. In the present chapter we make an attempt to assess how the individual entrepreneurs' perceive the importance of various factors considered to be relevant for deciding the location of their units. This assessment is undertaken on the basis of responses from the entrepreneurs of 29² factories selected on a sample basis as described in chapter I. Before analysing the entrepreneurs' responses, it would, however, be useful to briefly describe the structure of the selected factories and some characteristics of their entrepreneurs.

The Structure of Sampled Factories

The distribution of sampled factories by industry group and district is given in Table IV:1. The sample has been constrained by several considerations as outlined earlier, and therefore, may not be exactly representative of the product group and spatial structure of industries

Table IV - 1

Districtwise and Industrywise Distribution of Sample Units

Code	Products	Varanasi	Kanpur	Agre	Meerut	Ghaziabad	Lucknow	Aligarh	Saharan-	Dehra Dun	Moradabad	Muzaffar-	Aligarh	Allahabad	Mirzapur	Naatal	Bareilly	Rohtak-	Mathura	Jaunpur	Korakhpur	Unao	Etahpur	Total
205.3	Bakery and Milk Products	3	9	-	-	-	-	-	1	1	1	-	1	3	-	-	1	2	-	1	-	-	-	22
211.0	Oil and Grain Mill Products	2	3	3	-	-	1	-	1	-	2	-	3	3	-	-	2	-	-	-	2	2	3	25
280.5	Straw Board and Mill Board	1	1	-	-	1	-	1	3	-	-	1	2	-	-	-	-	-	-	-	-	-	12	
300.3	Cycle Tyre and Tubes	2	1	-	1	3	-	-	2	-	-	2	-	-	-	-	-	-	-	-	-	-	11	
310.1	Basic Industrial Chemicals	1	8	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	13	
321.1	Glass Products	-	-	4	-	-	1	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	7	
323.1	China Wares	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18	
329.1	Cement and Hume Pipes	3	-	-	1	1	1	-	-	-	-	-	-	1	-	2	-	1	2	-	-	-	12	
331.1	Casting and Forging	2	3	11	2	13	2	1	2	-	3	2	2	2	1	-	1	1	2	1	1	1	54	
331.3	Steel Pipes	-	5	1	-	3	-	-	3	-	-	-	-	-	-	1	-	-	-	-	-	2	15	
340.3	Nuts and Bolts and Metal Containers	-	8	4	-	4	1	-	1	-	-	-	4	1	-	-	-	-	-	-	-	-	24	
343.3	Agricultural Hand Tools and Implements	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	1	7	
345.2	Metal Utensils	3	8	3	-	2	2	2	1	-	7	1	1	-	3	-	-	3	-	1	-	-	37	
350.2	Manufacture of Light Agricultural Machinery and Equipment	3	1	-	-	4	-	-	1	-	-	1	3	-	-	-	-	-	-	-	-	-	14	
973.0	Repair of Motor Vehicles	-	4	3	-	-	-	-	1	2	1	-	2	-	-	-	4	-	-	-	-	1	21	
	Total	20	51	30	6	36	8	4	16	2	16	7	18	12	4	3	10	17	5	3	5	9	5	292

in the State. But by and large, the number of factories selected in each district and industry group are found to follow the pattern of ^{their} relative importance. The characteristics of the sample as described below are also not found to significantly vary from those of the industrial structure of the State as a whole.

There has been a rapid growth of the number of factories in the State during the last two decades, over 50 per cent of the working factories in 1975 were reported to have been established during the previous 15 years. In our sample taken out of the list for 1977, we have around 60 per cent factories less than 15 years' old, and only 12 per cent aged 25 years or more. The proportion of new units is significant among units in cycle tube and tyres, china-ware, cement and hume pipes, casting and forging, nuts and bolts, and metal utensils. The sampled factories are dominated by the young ones in Ghaziabad, Lucknow, Bulandshahr, Gorakhpur and Sitapur, and by old ones in Kanpur, Saharanpur, Moradabad, Aligarh, Allahabad and Unnao. On an average, a sampled factory is about 14 years old, but those in glass products, basic industrial chemicals are relatively older at around 20 years and those

in cycle tyres and tubes are the youngest at an average of 7 years, the next youngest being those in china-ware (10.16 years) and cement and hune pipes (11.67 years). Units in Mathura reveal the highest average age at 20 years followed by Mirzapur at 19.50 years; and those in Lucknow are the youngest at 7 years followed by Meerut, Ghaziabad and Bulandshahr at around 9.70 years.

Small units are found to dominate the size-structure of factories in the sample : 49 per cent of them have an employment size of 10 to 20 workers and another 39 per cent of 20-50 workers (Table IV:2(a) and IV:2(b)). This pattern is found in almost all the selected industries and districts except that units manufacturing metal products, particularly nuts, bolts and metal containers, and metal utensils have a larger proportion of factories employing 20-50 workers. Among districts, Agra, Lucknow and Moradabad depart from the general size pattern to the extent that most of the factories in these districts have an employment size of 20-50 workers each. Only 7 per cent of the factories have an employment size of 50-100 workers and only 5 per cent of more than 100 workers. These relatively large sized factories are found concentrated mostly in the following product groups : casting and forging, cycle tyres and tubes, glass products, nuts bolts and metal containers and

Table IV - 2(a)

Distribution of Sample Units (Industrywise) by Employment Size

Code	Products	10- 20	20- 50	50- 100	100- 250	250+	Total
205.3	Bakery & Milk products	15	5	1	-	1	22
211.0	Oil and Grain Mill Products	11	12	2	-	-	25
260.5	Straw Board and Mill Board	7	4	-	1	-	12
300.3	Cycle Tyre & Tubes	3	4	2	1	1	11
310.1	Basic Industrial Chemicals	5	5	1	1	1	13
321.1	Glass Products	3	1	-	2	1	7
323.1	China-ware	12	4	1	1	-	18
329.1	Cement and Hume Pipe	7	3	2	-	-	12
331.1	Casting and Forging	23	22	7	2	-	54
331.3	Steel Pipes	8	5	2	-	-	15
340.3	Nuts and Bolts and Metal Containers	7	12	2	2	1	24
343.5	Agricultural Hand Tools & Implements	5	2	-	-	-	7
345.2	Metal Utensils	13	24	-	-	-	37
350.2	Manufacture of Light Agricultural Machinery and Equipment	8	6	-	-	-	14
973.0	Repair of Motor Vehicles	16	5	-	-	-	21
	TOTAL	143	114	20	10	5	292

Table IV - 2(b)Distribution of Sample Units (District-wise) by Employment Size

District	10-20	20-50	50-100	100-250	250+	Total
1. Varanasi	11	7	2	-	-	20
2. Kanpur	23	21	4	1	2	51
3. Agra	8	17	2	2	1	30
4. Meerut	4	1	-	-	1	6
5. Ghaziabad	13	11	7	4	1	36
6. Lucknow	3	5	-	-	-	8
7. Bijnor	2	2	-	-	-	4
8. Saharanpur	10	5	-	1	-	16
9. Dehradun	1	1	-	-	-	2
10. Moradabad	7	9	-	-	-	16
11. Muzaffarnagar	5	2	-	-	-	7
12. Aligarh	13	5	-	-	-	18
13. Allahabad	6	2	2	2	-	12
14. Mirzapur	1	3	-	-	-	4
15. Nainital	1	2	-	-	-	3
16. Bareilly	6	4	-	-	-	10
17. Bulandshahr	12	4	1	-	-	17
18. Mathura	2	2	1	-	-	5
19. Jaunpur	1	2	-	-	-	3
20. Gorakhpur	7	3	-	-	-	10
21. Unnao	6	3	-	-	-	9
22. Sitapur	1	3	1	-	-	5
TOTAL	143	114	20	10	5	292

basic industrial chemicals. Most of them are located in Ghaziabad, Kanpur, Agra and Allahabad.

Despite similarity in the size group distribution of factories among industries and districts, the average employment size of factories shows wide variations (Table IV:3). Average employment size varies from 17 workers in repair of motor vehicles to 105 in glass products, among product groups; and from 14 workers in Dehradun to 67 workers in Ghaziabad, among districts. The 'largest' average employment size (of 270 workers) is recorded by cycle tube and tyre units in Meerut and nuts and bolts units in Ghaziabad. Within the same product groups, different districts show widely varying employment size, bakery and milk product units have an average employment size of 10 in Saharanpur and of 72 workers in Kanpur; each of the straw board and mill board units in Bijnor employ an average of 11 workers, while these in Saharanpur employ 103 workers; cycle tubes and tyres units tend to have a relatively larger size, yet it varies between 30 workers in Varanasi to 268 in Meerut. Similary bolts and nuts units tend to have relatively larger average size and also large variations among districts. The product groups which more or less uniformly have small sizes across the

Table IV - 3
Distribution of Units Districtwise and Industrywise by Average
Size of Employment

Code	Products	Varanasi	Kanpur	Agra	Meerut	Chazlabad	Lucknow	Bijnor	Saharanpur
205.3	Bakery and Milk Products	13.66	71.66	-	-	-	-	-	10.00
211.0	Oil and Grain Mill Products	14.50	30.00	35.00	-	-	11.00	-	18.00
280.5	Straw Board and Mill Board	17.00	30.00	-	-	15.00	-	11.00	103.33
300.3	Cycle Tyre and Tubes	29.50	71.00	-	268.00	68.00	-	-	30.50
310.1	Basic Industrial Chemicals	90.00	99.62	-	-	59.66	-	-	-
321.1	Glass Products	-	-	125.75	117.00	-	45.00	-	-
323.1	China Wares	-	-	110.00	-	-	-	-	-
329.1	Cement and Hume Pipes	20.00	-	-	16.00	12.00	17.00	-	-
331.1	Casting and Forging	51.50	26.00	29.00	28.00	48.42	33.50	10.00	23.50
331.3	Steel Pipes	-	16.80	44.00	-	55.33	-	-	12.33
340.3	Nuts and Bolts and Metal Containers	-	43.75	27.50	-	269.25	20.00	-	33.00
343.5	Agricultural Hand Tools and Implements	-	-	-	14.00	-	-	-	-
345.2	Metal Utensils	29.33	29.37	37.00	-	14.50	28.00	24.00	14.00
350.2	Manufacture of Light Agricultural Machinery and Equipment	32.33	19.00	-	-	17.25	-	-	12.00
973.0	Repair of Motor Vehicles	-	14.25	29.66	-	-	-	-	10.00
Average of Districts		29.20	48.15	46.37	61.33	67.36	27.00	17.25	34.63

Table IV - 3 (contd.)

Code	Products	Bareilly	Buland- shahr	Mathura	Jaunpur	Gorakhpur	Unnao	Sitapur	Industry Average
205.3	Bakery and Milk Products	26.00	-	-	14.00	19.00	-	-	38.31
211.0	Oil and Grain Mill Products	21.00	-	-	-	-	22.50	32.33	25.32
280.5	Straw Board and Mill Board	-	-	-	-	-	14.00	-	40.50
300.3	Cycle Tyre and Tubes	-	-	-	-	-	-	-	67.72
310.1	Basic Industrial Chemicals	-	-	16.00	-	-	-	-	83.23
321.1	Glass Products	-	-	-	-	-	-	-	104.57
323.1	China Wares	-	19.18	-	-	-	-	-	24.22
329.1	Cement and Hume Pipes	-	-	47.50	-	11.00	-	-	26.08
331.1	Casting and Forging	15.00	-	20.50	42.00	34.00	15.00	-	33.62
331.3	Steel Pipes	-	-	-	-	-	22.50	-	26.80
340.3	Nuts and Bolts and Metal Containers	-	-	-	-	-	-	22.00	73.04
343.5	Agricultural Hand Tools and Implements	10.5	-	-	-	-	31.00	-	16.85
345.2	Metal Utensils	-	-	-	24.00	33.66	-	-	26.37
350.2	Manufacture of Light Agricultural Machinery and Equipment	-	-	-	-	-	-	21.00	22.00
973.0	Repair of Motor Vehicles	19.50	-	-	-	11.66	18.00	-	16.76
Average of Districts		18.20	19.18	30.40	26.67	21.10	20.22	28.00	37.55

Table IV - 3 (contd.)

Code	Products	Dehra Dun	Moradabad	Muzaffar- nagar	Aligarh	Allahabad	Mirzapur	Nainital
205.3	Bakery and Milk Products	-	14.00	-	18.00	15.66	-	-
211.0	Oil and Grain Mill Products	-	19.00	-	22.00	30.66	-	-
280.5	Straw Board and Mill Board	-	-	39.00	18.00	-	-	-
300.3	Cycle Tyre and Tubes	-	-	31.00	-	-	-	-
310.1	Basic Industrial Chemicals	-	-	-	-	-	-	-
321.1	Glass Products	-	-	-	-	97.00	-	-
323.1	China Wares	-	-	-	-	-	-	-
329.1	Cement and Hume Pipes	-	-	-	-	57.00	-	22.50
331.1	Casting and Forging	-	22.33	13.50	17.50	60.00	30.00	-
331.3	Steel Pipes	-	-	-	-	-	-	24.00
340.3	Nuts and Bolts and Metal Containers	-	-	-	19.25	84.00	-	-
343.5	Agricultural Hand Tools and Implements	-	19.00	-	-	-	-	-
345.2	Metal Utensils	-	27.00	15.00	10.00	-	21.33	-
350.2	Manufacture of Light Agricultural Machinery and Equipment	-	-	10.00	26.66	-	-	-
973.0	Repair of Motor Vehicles	13.50	17.00	-	12.00	-	-	-
Average of Districts		13.50	22.69	21.86	19.22	48.17	23.50	23.00

districts are : repair of motor vehicles, light agricultural machinery and equipment, agricultural hand tools and implements, metal utensils and casting and forging.

In terms of size of output the sampled factories were relatively evenly distributed among the various sized group ranging from Rs.1 lakh to Rs.50 lakhs; a few units (5 per cent) ^{had} having an output size below Rs.1 lakh and similar number above Rs.50 lakhs in the reference year (i.e. 1978). Yet industry groups, bakery and milk products, china-ware, agricultural hand tools and repair of motor vehicles had most of the units with an output of less Rs.5 lakhs, and most of units in oil and grain products, straw board, casting and forging, steel pipes and nuts, bolts and metal containers produced output worth over Rs.5 lakhs (Table IV : 4(a)). Among districts, Bijnor, Saharanpur, Dehradun, Bareilly, Bulandshahr, Jaunpur and Gorakhpur had units mostly with smaller output each; and a sizeable proportion of units in Varanasi, Agra, Kanpur, Ghaziabad and Allahabad produced goods worth over Rs.20 lakhs each (Table IV : 4(b)).

Industrywise Distribution by Size of Output

Code	Products	Output (Rs.)						
		Less than 1 lakh	1-2.5 Lakhs	2.5-5 Lakhs	5-10 Lakhs	10-20 lakhs	20-50 Lakhs	50+ Total
205.3	Bakery & Milk Products	1	8	6	1	2	3	1 22
211.0	Oil and Grain Mill Pro- ducts	-	1	4	4	8	4	4 25
280.5	Straw Board & Mill Board	1	4	1	3	1	2	- 12
300.3	Cycle Tyre and Tubes	-	-	3	-	2	4	2 11
310.1	Basic Industrial Chemi- cals	1	1	3	1	4	2	1 13
321.1	Glass Products	-	2	1	1	2	1	- 7
323.1	China wares	2	14	-	1	1	-	- 18
329.1	Cement and Hume Pipes	2	2	2	1	3	2	- 12
331.1	Casting and Forging	3	57	8	14	14	6	2 54 55
331.3	Steel Pipes	-	3	2	5	2	2	1 15
340.5	Nuts and Bolts and Metal Containers	-	2	3	3	7	6	3 24
343.5	Agricultural Hand Tools and Implements	1	2	2	1	1	-	- 7
345.2	Metal Utensils	1	4	10	10	9	3	- 37
350.2	Manufacture of Light Agri- cultural Machinery and Equipment	1	2	4	4	3	-	- 14
973.0	Repair of Motor Vehicles	2	5	10	2	2	-	- 21
Total		15	57 56	59	51	61	35	14 292 291

~~Table IV - 4(a) - Industrywise Distribution by Size of Output~~

~~(continued on next page)~~

Table IV - 4(b)

Districtwise Distribution by Size of Output

Districts	Output (Rs.)							Total
	Less than 1 lakh	1-2.5 lakhs	2.5-5 lakhs	5-10 lakhs	10-20 lakhs	20-50 lakhs	50 +	
1. Varanasi	-	4	7	4	3	2	-	20
2. Kanpur	1	8	7	11	11	8	5	51
3. Agra	-	3	6	2	13	6	-	30
4. Meerut	1	1	1	2	-	-	1	6
5. Ghaziabad	4	2	1	9	9	6	5	36
6. Lucknow	-	1	2	4	-	1	-	8
7. Bijnor	-	2	1	-	1	-	-	4
8. Saharanpur	-	4	5	3	3	1	-	16
9. Dehradun	-	2	-	-	-	-	-	2
10. Moradabad	1	4	3	1	5	2	-	16
11. Muzaffarnagar	-	3	1	1	1	1	-	7
12. Aligarh	-	3	6	4	2	3	-	18
13. Allahabad	2	1	1	2	3	2	1	12
14. Mirzapur	1	-	1	1	-	1	-	4
15. Nainital	-	-	1	1	1	-	-	3
16. Bareilly	-	1	7	1	1	-	-	10
17. Bulandshahr	2	14	-	1	-	-	-	17
18. Mathura	-	-	1	1	1	2	-	5
19. Jaunpur	-	1	2	-	-	-	-	3
20. Gorakhpur	2	-	4	1	3	-	-	10
21. Unnao	1	2	2	2	2	-	-	9
22. Sitapur	-	-	1	-	2	-	2	5
TOTAL	15	56	50	51	61	35	14	292

~~As per information No. 130 - Industry No. 130 - District - District~~
not given

~~Estimated as above (No. 130)~~

Average output per factory, however, varied widely: (Table IV - 5) among product groups pottery and chinaware units had the lowest average output of Rs.2.74 lakhs, while the highest average of Rs.39.66 lakhs was found among units producing nuts, bolts and metal containers. Units producing straw board, chinaware, agricultural hand tools, metal utensils, light agricultural machinery and equipment and repair of motor vehicles showed an average output of less than Rs.10 lakhs; and those producing cycle tyres and tubes, oil and grain mill products, and nuts and bolts, of over Rs.30 lakhs each. Among districts lowest average output was recorded by units in Bulandshahr, (Rs.1.63 lakhs) and the highest by Sitapur at Rs.43 lakhs. Units in Bijnor, Dehradun, Bulandshahr, and Jaunpur recorded an average output of less than Rs.5 lakhs, while there in Kanpur, Meerut, Gaziabad and Sitapur of over Rs.20 lakhs each.

Generally the average output size is found to vary across industries and districts in line with the average employment size. (The coefficient of rank correlation between average size of output and average size of employment in units computes to 0.685 for districts and 0.487 for industries). In a few cases, however, the two variables are

Table IV - 5

Distribution of Units Districtwise and Industrywise by Average Size of Output

Code	Product	Average Output (Rs. Lakhs)						
		Varanasi	Kanpur	Agra	Aeerut	Ghaziabad	Lucknow	Bijnor Saharan- pur Dehra.Dun
205.3	Bakery and Milk Products	2.05	40.01	-	-	-	-	1.86
211.0	Oil and Grain Mill Products	11.64	74.03	18.15	-	77.98	-	4.11
280.5	Straw Board and Mill Board	42.20	7.15	-	8.53	-	1.84	17.42
300.3	Cycle Tyre and Tubes	11.63	29.38	-	196.74	33.09	-	10.93
310.1	Basic Industrial Chemicals	37.11	32.03	-	6.93	-	-	-
321.1	Glass Products	-	-	14.44	-	5.11	-	-
323.1	China Wares	-	-	12.71	-	-	-	-
329.1	Cement and Hume Pipes	7.64	-	-	5.39	0.57	2.27	-
331.1	Casting and Forging	3.20	5.20	13.30	3.69	24.69	17.05	1.84
331.3	Steel Pipes	-	7.28	38.96	-	42.69	-	2.72
340.3	Nuts and Bolts and Metal Containers	-	33.82	8.47	-	146.04	9.00	17.59
343.5	Agricultural Hand Tools and Implements	-	-	-	0.98	-	-	-
345.2	Metal Utensils	5.53	6.16	18.14	-	5.81	4.21	7.19
350.2	Manufacture of Light Agricultural Machinery and Equipment	7.67	5.51	-	-	5.14	-	3.99
973.0	Repair of Motor Vehicles	-	2.87	7.55	-	-	-	2.38
								1.89
District Average		10.05	25.28	14.04	35.25	34.55	17.11	4.83
Output per worker		2.91	1.90	3.30	1.74	1.95	1.58	3.57
								4.06
								7.14

Table IV - 5 (contd.)

Code	Product	Moradabad	Muzaffar- nagar	Allgarh	Allahabad	Mirzapur	Nainital	Bareilly	Bulandshahr
205.3	Bakery and Milk Products	1.25	-	4.91	3.97	-	-	2.86	-
211.0	Oil and Grain Mill Products	18.82	-	14.82	19.69	-	-	7.55	-
280.5	Straw Board and Mill Board	-	12.52	19.09	-	-	-	-	-
300.3	Cycle Tyre and Tubes	-	12.62	-	-	-	-	-	-
310.1	Basic Industrial Chemicals	-	-	-	-	-	-	-	-
321.1	Glass Products	-	-	-	6.58	-	-	-	-
323.1	China Wares	-	-	-	-	-	-	-	1.63
329.1	Cement and Hume Pipes	-	-	-	10.00	-	7.54	-	-
331.1	Casting and Forging	5.34	3.54	5.80	11.78	0.90	-	6.57	-
331.3	Steel Pipes	-	-	-	-	-	9.06	-	-
340.3	Nuts and Bolts and Metal Containers	-	-	7.63	7.27	-	-	-	-
343.5	Agricultural Hand Tools and Implements	3.96	-	-	-	-	-	1.62	-
345.2	Metal Utensils	12.48	2.37	4.93	-	18.00	-	-	-
350.2	Manufacture of Light Agricultural Machinery and Equipment	-	1.76	7.64	-	-	-	-	-
973.0	Repair of Motor Vehicles	3.67	-	2.41	-	-	-	3.62	-
District Average		9.62	7.00	9.02	10.41	13.73	8.05	4.23	1.63
Output per Worker		2.36	3.11	2.13	4.63	1.71	2.86	4.30	11.71

Table IV - 5 (contd.)

Code	Product	Mathura	Jaunpur	Gorakhpur	Unnao	Sitapur	Industry Average	Output per Worker
205.3	Bakery and Milk Products	-	1.20	3.13	-	-	18.02	2.13
211.0	Oil and Grain Mill Products	-	-	-	9.60	65.84	30.20	0.84
280.5	Straw Board and Mill Board	-	-	-	1.21	-	9.96	4.07
300.3	Cycle Tyre and Tubes	-	-	-	-	-	35.98	1.89
310.1	Basic Industrial Chemicals	4.00	-	-	-	-	22.91	3.63
321.1	Glass Products	-	-	-	-	-	10.86	9.63
323.1	China Wares	-	-	-	-	-	2.74	8.84
329.1	Cement and Hume Pipes	34.51	-	0.86	-	-	10.51	2.48
331.1	Casting and Forging	8.94	4.25	3.07	10.29	-	20.49	1.64
331.3	Steel Pipes	-	-	-	5.92	-	15.39	1.74
340.3	Nuts and Bolts and Metal Containers	-	-	-	-	13.50	39.66	1.84
343.5	Agricultural Hand Tools and Implements	-	-	-	5.21	-	4.37	3.85
345.2	Metal Utensils	-	4.17	11.55	-	-	9.46	2.79
350.2	Manufacture of Light Agricultural Machinery and Equipment	-	-	-	-	3.96	5.88	3.74
973.0	Repair of Motor Vehicles	-	-	6.79	0.84	-	4.03	4.16
District Average		18.18	3.21	6.52	5.53	43.00	16.18	2.32
Output per Worker		1.67	8.31	3.24	3.66	0.65		

found to move differently. Oil and grain mills have a relatively large output but very low employment per unit. On the other hand, glass products and chinaware units show very high employment size in relation to their output size. Among districts, Sitapur records a high output size as compared to employment size per unit and Dehradun, Bulandshahr, Jaunpur large employment average as compared to output average. For the sample as a whole output worth Rs.1 lakh is accompanied by employment of 2.32 workers, in oil and grain mills the figure is only 0.84 workers, in glass products 9.63 and in chinaware 8.84 workers. Sitapur district shows a figure of 0.65, Dehradun 7.14, Bulandshahr 11.77 and Jaunpur 8.31 workers.

Accordingly, wide variations are found in productivity measured in terms of output per worker ~~and value added per worker~~ in the factory sector across the districts. Against an average of Rs.42,852 as value of output per worker for the entire sample, Bulandshahr units have as low a figure as Rs.8,510, Jaunpur, Rs.12,041, and Dehradun Rs.14,017. It must, however, be noted that Bulandshahr sample is dominated by China-ware units, and Dehradun by repair units which show low productivity elsewhere as well. But Jaunpur units have

significantly lower than average productivity in each of the industry in the sample. The highest value of output per worker is shown by the sampled units in Sitapur (Rs.153565), followed by Mirzapur (Rs.67104) and Meerut (Rs.54968). The sample for Sitapur is dominated by oil and grain mills, which in any case show a high productivity in most districts, but Sitapur units in this industry generate much higher than average value of output ^{per} worker. High productivity of Mirzapur units is not on account of its structure of sample units, as the major sampled industry in that district, metal utensils, is not one with very high productivity in general; but units in this industry in Mirzapur have very high productivity as compared to these in other districts. Meerut units show lower than average productivity in most industries, but since the structure of sample units in that district has been weighed heavily in favour of cycle tyres and tubes which ^{have} generally high productivity, the district comes up as a high productivity one.

Entrepreneurs

Most of the units have partnership as their form of organisation : 76 per cent of them are in this category.

Another 13 per cent are operated as individual propriety concerns. 10 per cent are private limited companies and 2 per cent public limited companies. No wonder, therefore, that most of the units have their entrepreneurs working with them. Only less than five per cent of entrepreneurs are absentee owners, rest are working in the units they have promoted, 79 per cent as working partners or managing directors, 18 per cent as managers and rest in some other capacities. Absentee entrepreneurs are found to a significant measure in the units in basic industrial chemicals, and steel pipes, and in Kanpur and Ghaziabad districts. This mainly reflects the relatively large size and public limited form of organisation.

An average entrepreneur is aged 43 years in fact, the average age of entrepreneurs falls between 41 and 45 years in most industries. In glass products units however, an entrepreneur is 34 years old and in agricultural hand tools and equipment 38 years old. Those in basic industrial chemical units are the oldest ^{with} an average ^{age} hearing 50 years, followed by oil and grain mill owners at 48 years and entrepreneurs of casting and forging units at an average of 46 years. Those below 35 years of age constitute around 17 per cent and those above 50 years 21 per cent of the entrepreneurs.

All but 3 per cent of entrepreneurs are literate: 91 per cent are at least matriculates, 48 per cent graduates, and 12 per cent hold technical qualifications: 7 per cent of a degrees and 5 per cent of a diploma level. Units manufacturing cycle tube and tyre, basic industrial chemicals, steel pipes and manufacture of light agricultural machinery and equipment, have the most educated entrepreneurs: in each of these lines more than half of entrepreneurs are graduates. Those with technical qualifications are mostly found in the product groups casting and forging, cycle tyres and tubes, basic industrial chemicals, and repair of motor vehicles. Among districts Ghaziabad, Kanpur, Meerut, Lucknow and Bulandshahr have over half of the entrepreneurs as graduates; ^{and} Kanpur, Ghaziabad, Lucknow and Unnao had a significant proportion of their entrepreneurs with technical qualifications.

The entrepreneurs were predominantly of local origin: over two-thirds of the entrepreneurs belonged to the same district in which their factory was located (Table IV - 6). This proportion of local to non-local entrepreneurs was observed in all industries except in basic industrial chemicals, where majority of the entrepreneurs were non-local

TABLE IV : 6 (a)
Industrywise distribution of Units by Domicile Status of Entrepreneurs

Code	Products	Local	Non-Local	Total	Rural	Urban	Total
205.3	Bakery & Milk Products	15	7	22	2	20	22
211.0	Oil and Grain Mill Products	19	6	25	4	21	25
230.5	Straw Board and Mill Board	8	4	12	1	11	12
300.3	Cycle Tyre and Tubes	7	4	11	1	10	11
310.1	Basic Industrial Chemicals	7	26	12/3	2	20 13	22
321.1	Glass Products	6	1	7	2	5	7
323.1	China Wares	16	2	18	5	13	18
329.1	Cement and Kume Pipes	7	5	12	2	10	12
331.1	Casting and Forging	35	19	54	12	42	54
331.3	Steel Pipes	9	6	15	2	13	15
340.3	Nuts and Bolts and Metal Containers	14	10	24	6	18	24
343.5	Agricultural Hand Tools and Implements	6	1	7	1	6	7
345.2	Metal Utensils	28	9	37	6	31	37
350.2	Manufacture of Light Agricultural Machinery and Equipment	10	4	14	1	13	14
973.0	Repair of Motor Vehicles	15	6	21	-	21	21
TOTAL		200	92	292	47	245	292

~~Source: Industry Survey conducted by the Government of India~~

TABLE IV-16 (b)

Districtwise distribution of Units by Domicile status of Entrepreneurs

Districts	Local	Non-Local	Total	Rural	Urban	Total
1. Varanasi	15	5	20	2	18	20
2. Kanpur	30	25 21	55 51	10	45 41	55 51
3. Agra	24	6	30	6	24	30
4. Meerut	6	-	6	-	6	6
5. Ghaziabad	12	24	36	7	29	36
6. Lucknow	7	1	8	1	7	8
7. Mynor	4	-	4	1	3	4
8. Saharanpur	12	4	16	1	15	16
9. Dehradun	1	1	2	-	2	2
10. Moradabad	11	5	16	2	14	16
11. Musaffernagar	6	1	7	1	6	7
12. Aligarh	16	2	18	2	16	18
13. Allahabad	10	2	12	1	11	12
14. Mirzapur	4	-	4	-	4	4
15. Nainital	3	-	3	2	1	3
16. Bareilly	5	5	10	2	8	10
17. Bulandshahr	15	2	17	5	12	17
18. Mathura	4	1	5	-	5	5
19. Jaunpur	3	-	3	-	3	3
20. Gorakhpur	6	4	10	-	10	10
21. Unao	5	4	9	1	8	9
22. Sitapur	1	4	5	3	2	5
TOTAL	200	91	291	47	245	291

~~Source: Survey of the State of Uttar Pradesh, 1954-55.~~

and in agricultural hand tools and implements where four-fifths were locals. Among districts, in Ghaziabad two-thirds of the entrepreneurs were of non-local origin but in Lucknow, Bijnor, Muzaffarnagar, Agra, Aligarh, Allahabad, Mirzapur, Nainital, Bulandshahr, Mathura and Jaunpur over 80 per cent of them were of local origin.

Urban areas provided the main source of entrepreneurs in all industries : 84 per cent of all entrepreneurs belonged to towns and cities (Table IV - 6). The only industries in which entrepreneurs originating from rural areas form at least 20 per cent are glass products, china-ware, casting and forging, and nuts, bolts and metal containers. Repair of motor vehicles have all its entrepreneurs from urban areas. Among districts Kanpur, Agra, Ghaziabad, Nainital, Bareilly, and Sitapur have at least 20 per cent of their entrepreneurs with rural origin. Business and Trading is the main occupation supplying entrepreneurs to the factories (Table IV - 7): 85 per cent of the entrepreneur had business and trading as their family occupation. Those with agricultural background constitute only 5 per cent and have mainly gone into china-ware and cement and hume pipe manufacture. The entrepreneurs with

Industrywise distribution of Units by Family Occupation of Entrepreneurs

Products	Agri- cul- ture	Busi- ness/ tra- ding	Service	No In- forma- tion	TOTAL
Bakery & Milk Products	1	21	-	-	22
Oil and Grain Mill products	-	23	-	2	25
Straw Board and Mill Board	-	11	1	-	12
Cycle Tyre and Tubes	1	9	1	-	11
Basic Industrial Chemicals	-	6	2	5	13
Glass Products	1	6	-	-	7
China Wares	3	11	2	2	18
Cement and Hume Pipes	2	9	1	-	12
Casting and Forging	2	46	5	1	54
Steel Pipes	1	14	-	-	15
Nuts and Bolts and Metal Containers	2	21	1	-	24
Agricultural Hand Tools and Implements	-	6	1	-	7
Metal Utensils	1	34	1	1	37
Manufacture of Light Agricultural Machinery and Equipments	-	13	1	-	14
Repair of Motor Vehicles	1	16	4	-	21
TOTAL	15	246	20	11	292

TABLE IV : 7(b)

Districtwise distribution of Units by Family Occupation of Entrepreneurs.

Districts	Agriculture	Business/trading	Service	No Information	TOTAL
1. Varanasi	-	19	-	1	20
2. Kanpur	2	40	1	8	51
3. Agra	2	25	3	-	30
4. Meerut	-	5	1	-	6
5. Ghaziabad	-	30	6	-	36
6. Lucknow	1	6	1	-	8
7. Bijnor	-	4	-	-	4
8. Saharanpur	-	16	-	-	16
9. Dehradun	-	2	-	-	2
10. Moradabad	-	14	2	-	16
11. Muzaffarnagar	1	6	-	-	7
12. Aligarh	1	16	1	-	18
13. Allahabad	-	12	-	-	12
14. Mirzapur	-	4	-	-	4
15. Nainital	2	1	-	-	3
16. Bareilly	3	5	2	-	10
17. Bulandshahr	3	10	2	2	17
18. Mathura	-	5	-	-	5
19. Jaunpur	-	3	-	-	3
20. Gorakhpur	-	10	-	-	10
21. Unnao	-	8	1	-	9
22. Sitapur	-	5	-	-	5
TOTAL	15	246	20	11	292

agricultural background are found to make a significant proportion of the total in the Nainital, Bareilly and Bulandshahr.

Almost half (49 per cent) ^{of the} entrepreneurs had some previous working experience before they launched the present venture, two-thirds of them in the same line of business as they are engaged in now. Those with experience dominated the sample in oil and grain mill products, glass products and casting and forging. In most of these cases, the entrepreneur's previous experience was in the present line of activity but in basic industrial chemicals, nuts bolts and metal containers, light agricultural machinery and equipment and ~~stew~~^{stew} board and mill board units the previous experience of the entrepreneurs was mostly in other than the present line of activity. Most of the entrepreneurs in cement and hume pipes, steel pipes, nuts, bolts and metal containers, agricultural hand tools, metal utensils, light agricultural machinery and equipment and repair of motor vehicles reported no previous experience. Those who had experience, had spent at least two years in previous activity, but most had experience of over 5 years, and 40 per cent of over 10 years. Majority of the entrepreneurs in

Lucknow, Ghaziabad, Allahabad, Bulandshahr and Unnao were experienced, mostly in same line of activity as their present factory deals in; but those with no previous experience dominated the sample of entrepreneurs in Agra, Meerut, Saharanpur, Dehradun, Aligarh, Mirzapur, Nainital, Mathura and Jaunpur.

Entrepreneurs' Assessment of Locational Factors

Rarely does one find a single factor act as the motivating force behind a location decision. There are a number of economic factors that an entrepreneur may like to consider/^{so}as to assess the potential performance of a location. Besides, the non-economic factors also feature as important influences, which, to a certain extent, may be considered by entrepreneurs as compensating for the unfavourable economic situation. Therefore the entrepreneurs mention more than one factor as motivating them to locate their factory where it is, so that we have as many as 997 responses from 292 entrepreneurs of the sampled factories.

If we accept the frequency by which a factor is mentioned as a measure of its importance, some of the non-economic factors seem to emerge as having the most important

influence in location (Table IV - 8(a) and 8(b)). Preference for the place of their origin and residence is found to have weighed with 63 per cent entrepreneurs in deciding the location of their factories. Attraction of good social and community life features as one of the considerations for 16 per cent of the entrepreneurs. The former^{is} found to have been mentioned most often by entrepreneurs in all product groups except in glass products, cement and house pipes and repair of motor vehicles; and, in all districts except Ghaziabad, Nainital, and Sitapur. Better social and community life was mentioned as one of the motivating factors, by a significant number of entrepreneurs in Varanasi, Lucknow, Bareilly, Jaunpur and Unnao.

Among the group of economic factors, the availability of raw material locally was the most frequently mentioned factor : 45 per cent of entrepreneurs reported that it was one of the factors influencing their location decision. Entrepreneurs in industry groups oil and grain mill products and straw board and mill board found it a important factor most often; but it seemed of little significance in the location of units in industries like cycle tyres and tubes and repair of motor vehicles. A related factor, proximity

Table - IV - a (a)

Entrepreneurs Assessment of Locational Facilities (Industrywise)

Locational Factors	Industry	205.3	211.0	280.5	300.3	310.1	321.1	323.1	329.1	331.1	331.3	340.3	343.5	345.2	350.2	973.0	Total
Entrepreneur belonged to this place		15	14	8	8	7	3	15	6	39	10	14	4	25	8	8	184
Better social and Community life		3	4	3	3	1	2	1	1	6	5	3	1	9	4	1	47
Availability of raw material		7	24	8		2	2	6	5	27	8	11	2	21	6	-	131
Proximity to producers of Intermediate Products		-	2	-	1	2	1	2	1	1	3	5	1	2	1	2	24
Existence of similar units		3	4	1	4	1	2	10	2	17	4	5	1	11	2	17	84
Availability of skilled labour		1	2	2	2	1	2	8	1	11	4	4	1	7	2	3	51
Cheap local labour		-	6	2	3	2	2	2	3	11	-	6	-	3	2	8	50
No. industrial unrest		3	-	2	2	1	1	3	3	6	5	3	3	7	2	1	42
Transport connection to raw material source		-	8	4	-	2	2	-	3	7	3	6	1	9	6	2	53
Transport connection to main market		-	6	3	-	2	3	-	5	4	-	8	1	9	8	3	52
Banking facilities		-	1	2	-	1	1	-	2	6	5	3	1	10	2	3	39
Better Power Supply		-	3	-	-	1	1	-	2	5	2	3	-	7	2	1	27
Market (local/near)		10	6	12	3	7	2	7	1	21	4	12	-	18	4	7	114
Industrial Estate		-	-	2	5	3	-	4	5	16	2	3	2	8	4	1	55
Finance at favoured terms		-	-	1	1	1	1	-	4	3	1	4	2	3	1	1	23
Tax and duty exemption		-	-	-	-	2	-	-	-	2	-	1	-	-	2	-	7
Any other		-	-	-	-	-	-	3	-	2	-	-	-	1	-	-	6
Any other		-	-	1	1	-	2	1	-	2	-	1	-	-	-	-	8
No. of Units		22	25	12	11	13	7	18	12	53	15	24	7	37	14	21	292

Table - IV - a (b)

Districtwise Assessment of Locational Factor

Locational Factors	Varanasi	Kanpur	Agra	Meerut	Ghaziabad	Lucknow	Bijnor	Saharanpur	Dehra Dun	Moradabad	Muzaffarnagar	Aligarh	Allahabad	Mirzapur	Nainital	Bareilly	Bulandshahr	Mathura	Jaunpur	Gorakhpur	Unnao	Sitapur	No. of Units
Entrepreneur belonged to this place	14	29	13	5	20	6	4	12	-	8	6	15	9	3	1	3	14	4	3	6	6	1	184
Better Social Life	11	13	1	-	4	5	-	-	-	-	-	-	1	1	1	2	1	-	3	-	4	-	41
Raw material availability	9	18	19	2	22	5	4	9	-	8	1	8	4	3	1	3	6	3	1	-	2	3	131
Proximity to Intermediate Products	-	8	1	-	6	1	-	-	-	-	-	1	-	-	-	2	2	1	-	-	2	-	24
Existence of Similar Units	6	15	8	-	14	2	-	-	2	5	-	2	3	1	-	3	10	-	-	-	2	1	84
Availability of Skilled Labour	4	10	8	-	12	-	-	-	-	-	-	3	1	1	-	-	8	-	-	2	2	-	51
Cheap Local Labour	3	3	14	1	7	-	1	2	-	-	2	3	2	-	-	3	2	4	-	-	2	-	50
No. Industrial Unrest	4	1	2	-	8	-	-	3	-	5	1	2	-	-	3	3	3	1	3	2	1	-	42
Transport Connection to Raw Material Source	7	7	4	1	9	3	-	2	-	-	3	1	2	-	-	-	-	1	-	7	3	3	51
Transport Connection to Main Market	9	8	2	1	10	3	-	-	-	1	1	2	2	-	-	-	-	-	-	8	2	3	52
Banking Facility	1	13	-	-	9	1	-	-	-	-	-	-	-	-	-	-	-	-	1	7	6	1	39
Better Power Supply	3	6	-	-	9	2	-	-	-	-	-	1	1	-	-	-	-	-	-	3	1	1	27
Market (Local or near)	14	26	10	1	12	1	1	4	-	1	3	8	2	4	-	1	6	-	3	8	6	3	114
Industrial Estate	7	5	-	3	24	2	-	-	-	-	1	4	2	-	-	-	4	-	-	2	1	-	55
Finance at Favoured Terms	6	2	-	1	4	3	-	-	-	-	1	-	2	-	-	-	-	-	-	2	1	1	23
Tax and Duty Exemption	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	7
Any other	1	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	6
Any other	-	1	-	-	1	-	-	-	-	-	2	-	3	-	-	-	1	-	-	-	-	-	8
No. of Units	20	51	30	6	35	8	4	16	2	16	7	18	12	4	3	10	17	5	3	10	9	5	293

to the producers of intermediate products was found to be of some consequence in eight per cent cases, mostly in basic industrial chemicals, steel pipes and nuts, bolts and metal containers. A majority of units in Agra, Ghaziabad, Lucknow, Bijnor, Saharanpur, Mirzapur, Mathura, and Sitapur considered raw material availability important, and a sizeable percentage of them in Kanpur, Ghaziabad, Bareilly and Unnao considered proximity to the producers of intermediate products a factor influencing their location decision. Existence of similar units in the vicinity also seems to provide a positive influence on location, probably because it facilitates ease of access to certain common industrial facilities and inputs already available : 29 per cent of the entrepreneurs considered it important, most prominently in the industry groups china-ware, repair of motor vehicles, casting and forging, cycle tyres and tubes and metal utensils. Such units featured prominently in Kanpur, Varanasi, Agra, Ghaziabad, Lucknow, Moradabad, Allahabad, Bulandshahr and Gorakhpur districts.

The next most frequently mentioned factor is the nearness to the market : around two-fifths of entrepreneurs considered it as influencing location. It featured most

Transport connection to the market and source of raw material each was mentioned by 15 per cent of entrepreneurs as a factor in location. Transport link to the market was most frequently mentioned by units in cement and hume pipes, nuts, bolts and metal containers and light agricultural machinery and equipment; and in Varanasi, Ghaziabad, Lucknow, Gorakhpur and Sitapur district. In oil and grain mill products, straw board and mill board, and light agricultural machinery and equipment, transport connection to the raw material head was considered important by most units. Units located in Varanasi, Lucknow, Mirzapur Gorakhpur and Sitapur districts found it important most often in influencing their location.

Since banking facilities are generally available in most of the centres, it may not have had a differential influence in the entrepreneurs' choice of location. Yet it was mentioned as favourable factor by 13 per cent entrepreneurs most often in Kanpur, Ghaziabad, Gorakhpur and Unnao. Finance on favoured terms influenced location decisions in only 8 per cent cases, strangely enough, mostly in the non-backward districts like Varanasi, Lucknow and Gorakhpur; Varanasi and Ghaziabad also have some entrepreneurs who found certain tax and duty exemptions as motivating their location.

Better power supply featured as a factor in only less than 10 per cent cases probably because no location in Uttar Pradesh has a particularly better power supply to attract location significantly on this account. Yet over 20 per cent of the units in Ghaziabad, Lucknow and Gorakhpur thought that they located their units there because of better power supply. Existence of industrial estates attracted location of units in a district in 19 per cent cases. Over two-thirds of the Ghaziabad entrepreneurs reported that it influenced their decision to located their factories there. Its influence was also found significant in Varanasi and Meerut.

Let us now sum up the entrepreneurs' assessment of the factors affecting their decisions regarding to locate their units by industry and district. The following emerge as the important considerations in the order mentioned as factors in location in each of the 15 selected industries. (Factors mentioned by at least one-third of the entrepreneurs only are listed. Percentages in the brackets being those of entrepreneurs mentioning the respective consideration).

- | | |
|---|--|
| <p>1. <u>Bakery and Milk Products</u></p> | <p>1. Entrepreneurs' native place(68%)
2. Proximity to market (45%)
3. Availability of raw material(33%)</p> |
|---|--|

2. Oil and grain mill products
 1. Availability of raw material (96%)
 2. Entrepreneurs' native place (56%)
 3. Transport connection to raw material source (33%)
3. Straw Board and Mill Board
 1. Proximity to market (100%)
 2. Entrepreneurs' native place (66%)
 3. Availability of raw material (66%)
 4. Transport connection to raw material source (33%)
4. Cycle Tyres and Tubes
 1. Entrepreneurs' native place (72%)
 2. Industrial Estate (45%)
 3. Existence of similar unit (36%)
5. Basic Industrial Chemicals
 1. Entrepreneurs' native place (54%)
 2. Proximity to market (54%)
6. Glass Products
 1. Entrepreneurs' native place (43%)
 2. Transport connection to main market (43%)
7. China-ware
 1. Entrepreneurs' native place (83%)
 2. Existence of similar units (56%)
 3. Availability of skilled labour (44%)
 4. Proximity to market (39%)

8. Cement and Hume Pipes
 1. Entrepreneurs' native place (50%)
 2. Availability of raw material (42%)
 3. Transport connection to main market (42%)
 4. Industrial Estate (42%)
9. Casting and Forging
 1. Entrepreneurs' native place (74%)
 2. Availability of raw material (51%)
 3. Proximity to market (40%)
 4. Industrial Estate (33%)
- 10 Steel Pipes
 1. Entrepreneurs' native place (66%)
 2. Availability of raw material (52%)
- 11 Nuts, Bolts and Metal Containers
 1. Entrepreneurs' native place (58%)
 2. Proximity to market (50%)
 3. Availability of raw material (46%)
 4. Transport connection to main market (33%)
- 12 Agricultural Handtools and Implements
 1. Entrepreneurs' native place (56%)
 - 2.
- 13 Metal Utensils
 1. Entrepreneurs' native place (68%)
 2. Availability of raw material (58%)
 3. Proximity to market (48%)
- 14 Manufacture of light agricultural machinery and equipment
 1. Entrepreneurs' native place (57%)
 2. Transport connection to main market (57%)
 3. Transport connection to raw material source (37%)
- 15 Repair of Motor Vehicles
 1. Existence of similar units (80%)
 2. Entrepreneurs' native place (36%)
 3. Cheap local labour (36%)

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Among the districts also one finds a similar pattern of considerations mentioned by the entrepreneurs as influencing their location decision. The consideration of being 'local' was found to have weighed with most of the entrepreneurs in all districts except in Dehradun, Gorakhpur and Sitapur. Availability of raw material also featured as a major consideration in over half the districts. Cheap local labour seems to have significance in Agra and Mathura, and lack of industrial unrest in Nainital, Bareilly and Jaunpur. Existence of an Industrial Estate seems to have attracted a significant number of entrepreneurs in Meerut and Ghaziabad. Availability of power was not considered as a significant factor favouring a particular district for location of factories.

Besides, their own assessment of the favourable factors for location quite a few entrepreneurs also had the benefit of advice, consultation and assistance from others -- officials, fellow industrialists^{etc.} In 26 per cent cases, mostly in Varanasi, Agra, Ghaziabad, Aligarh, Allahabad, Mirzapur, Bulandshahr, Jaunpur, Gorakhpur and Sitapur districts, the fellow industrialists provided information and advice

which helped in deciding the location. In 12 per cent cases, mostly in Varanasi, Kanpur, Ghaziabad, Mirzapur and Bulandshahr, government officials were found helpful in the process of location and in two cases, one in Ghaziabad and other in Allahabad, some political leaders also assisted in getting the industry located there.

Problems Due to Location

Even though personal factors, particularly domicile of the entrepreneur has been mentioned most frequently as one of the factors influencing the decision on location, the influence of other, particularly economic, factors influencing the cost and market cannot be reduced to insignificance. In fact, it may be argued that entrepreneurs' assessment of the various economic advantages and disadvantages of different locations probably did not yield any significant variation among districts, and given more or less similar cost and market situation, the domicile of the entrepreneur provided the final influence on the decision. The entrepreneurs' assessment could, however, go wrong. But, by and large, it looks that entrepreneurs' assessment is vindicated by experience. The problems that

they have faced in their operations in the recent past are generally common to all locations, and only marginally specific to a location.

Around one-third of the entrepreneurs' reported no problems; they constituted the majority of the sample in industry groups bakery and milk-products and cycle tyres and tubes; and in districts Varanasi, Dehradun and Mirzapur. On the other hand, over-two-thirds of units in Ghaziabad, Meerut, Kanpur, Gorakhpur, Agra, Bijnor, Moradabad, Muzaffarnagar, Bareilly and Bulandshahr, reported one problem or the other due to their location. Of the various problems reported by the units, those related with the supply of power were most often mentioned; over one-third of the units spread all over the State and different industry groups complained on this account. The problem is common to all products and locations; but its severity was felt more often by units in casting and forging and metal products. The problem was reported less acute in Varanasi, Saharanpur, Aligarh, Allahabad, Bareilly and Mathura where it was mentioned as a problem by less than one-fifths of the units. On the other hand, over three-fourths of the units in Ghaziabad, Gorakhpur and Sitapur reported affected by the problems of availability of power.

The next important problem faced by units related to raw material. Shortage of raw material affected 29 per cent units, and non-availability on time 11 per cent; 15 per cent complained of poor quality and 10 per cent of high prices of raw material. In most cases the raw material used is produced locally. In 54 per cent cases, the entire raw material is locally procured, in 27 per cent cases, both local and outside sources are combined, and only in 19 per cent cases the entire raw material is from outside. While in bakery and milk-products, oil and grain mills and cement and hume pipes, the raw material is mostly available locally, in metal utensils it is mostly procured from outside. Among districts, Kanpur, Agra, Mirzapur, Saharanpur, Bareilly and Sitapur units primarily rely on local sources for the procurement of raw materials, while Varanasi, and Unnao units use material mostly procured from outside. In rest of the districts, both sources are important; but local sources are used more often than outside sources in most of these districts.

The problem relating to raw material, mostly of the availability as such, was found rather acute by units in oil and grain mill products, Straw board and mill board, basic industrial chemicals and metal utensils; most of the units

in casting and forging units faced one or the other type of problem regarding raw material, quantity, quality, timely availability and price. District-wise, it was found that factories in Kanpur and Agra mostly complained of shortage of raw material; those in Meerut and Bareilly complained of unfavourable prices of raw material, those in Ghaziabad of its quality, and many of them ⁱⁿ Moradabad and Saharanpur of timely availability.

The next important problem reported facing around 20 per cent of the units is the shortage of skilled labour. This problem is found to be mainly affecting units in glass products, cement and hume pipes, agricultural implements and metal utensils. Industries in Kanpur, Ghaziabad, Allahabad and Moradabad reported it as a problem of significant magnitude.

Market is not found to be a very important constraint in the functioning of the units in most industry groups and locations. Only 10 per cent of the units considered it as a problem. In fact 90 per cent of the product of the sampled units is sold at the factory site itself, another three per cent through the factory depot outside and seven per cent through dealers. Units producing straw board and mill board,

and agricultural hand tools, and implements; and, those located in Bijner, Saharanpur, Gorakhpur, Unnao and Varanasi sell a larger proportion through dealers. The only products groups in which 'market' was reported as a problem by quite a few entrepreneurs are : casting and forging, repair of motor vehicles and china-ware; and the districts ⁱⁿ which the units reported it as such are : Bulandshahr, Moradabad and Kanpur. Finance was also not found to be a problem except by a small number, less than 5 per cent of units.

It looks that despite a heavy weight of the personal factors, particularly of the domicile of the entrepreneurs, in their decision on location, their assessment does not seem to have gone wide off the mark. Most of the problems faced in operations are hardly location-specific in the present situation. The most common problem faced by them relates to the availability of power which seems common to all locations in the State with only marginal variations. Otherwise no location seems to offer a definite advantage or disadvantage over the other, in general. On the basis of the respondents' expression of problems, however, Varanasi Lucknow, Mirzapur, Jaunpur, Saharanpur, Dehradun, Allahabad,

Bareilly, Bulandshahr, Mathura and Unnao seem to emerge as less problematic locations, and Ghaziabad, Gorakhpur, Meerut, Kanpur, Agra, Moradabad, and Sitapur as those posing more problems among the locations considered here.

Chapter - VCOMPARATIVE ADVANTAGE AND LOCATION

The economic factors that are considered for assessing the advantages and dis-advantages of a location would ultimately get reflected in the operational results of production in terms of costs and revenue. In brief and precise terms, the locational advantage of places can be compared in terms of these indicators. The indicator most often used for summarising^{as} the relative advantage of a location vis-a-vis others is cost per unit of output. Assuming a perfectly competitive market across locations; the unit cost would measure the relative advantage. But if the revenue per unit also varies among locations, it would prove an inadequate measure. And in practice, it is not realistic to assume that the space revenue curve takes the shape of a horizontal straight line, the price variations are often greater than can be accounted for by transport costs. It is, therefore, desirable to adopt a measure which takes care both of the cost and market conditions, thus allowing for spatial variations in price and revenue. The indicator that we have, therefore, chosen for the economic analysis of the comparative advantage of different

locations is cost to output ratio (COR), measured as cost per rupee value of the output. Inverse of this ratio can be taken to measure the surplus per rupee of output value.

Cost-Output Ratios (CORs)

The comparative locational advantage of the various selected districts ~~is presented~~ in terms of the CORs in different districts, in respect of the selected industries in the sample is presented in Table V - 1. The COR of all industries in the sample is found to be the lowest in Lucknow at 0.73 and the highest in Sitapur at 0.93. Most of the other districts show only a marginal (less than 5 per cent) variation from the average of 0.83. Thus it looks that, in general, the overall locational advantages or disadvantages of individual districts are only marginally different from each other. The districts which show a significant variation from the average cost-price ratio are Lucknow and Dehradun on the advantageous side, and Sitapur, Saharanpur, Bulandshahr and Nainital, on the disadvantageous side.

Table - V - 1

Districtwise and Industrywise Cost-Output Ratios (COR)

District	Varanasi	Kanpur	Agra	Meerut	Ghaziabad	Lucknow	Bijnor	Saharanpur	Dehra Dun	Moradabad	Muzaffarnagar	Aligarh	Allahabad	Mirzapur	Nautilal	Bareilly	Bulandshahr	Mathura	Jampur	Gorakhpur	Unao	Sitapur	Total
205.3	0.71	0.76	-	-	-	-	-	0.84	-	0.86	-	0.76	0.76	-	-	0.87	-	-	0.76	0.77	-	-	0.76
211.0	0.95	0.82	0.87	-	-	0.70	-	0.97	-	0.94	-	0.77	0.87	-	-	0.88	-	-	-	-	0.90	0.94	0.85
280.5	0.74	0.86	-	-	0.90	-	0.88	0.94	-	-	0.88	0.74	-	-	-	-	-	-	-	-	0.77	-	0.86
300.3	0.73	0.80	-	0.81	0.85	-	-	0.86	-	-	0.74	-	-	-	-	-	-	-	-	-	-	-	0.81
310.1	0.75	0.82	-	-	0.96	-	-	-	-	-	-	-	-	-	-	-	-	0.78	-	-	-	-	0.82
321.1	-	-	0.85	-	-	0.75	-	-	-	-	-	-	0.87	-	-	-	-	-	-	-	-	-	0.84
323.1	-	-	0.71	-	-	-	-	-	-	-	-	-	-	-	-	-	0.89	-	-	-	-	-	0.83
329.1	0.68	-	-	0.72	0.76	0.91	-	-	-	-	-	-	0.64	-	0.85	-	-	-	-	-	-	-	0.81
331.1	0.93	0.87	0.73	0.36	0.83	0.71	0.81	0.91	-	0.79	0.63	0.82	0.88	0.69	-	0.89	-	0.80	0.82	0.72	0.85	-	0.82
331.3	-	0.82	0.87	-	0.83	-	-	0.83	-	-	-	-	-	-	0.92	-	-	-	-	-	0.79	-	0.84
340.3	-	0.86	0.85	-	0.89	0.87	-	0.97	-	-	-	0.84	0.84	-	-	-	-	-	-	-	-	0.96	0.88
343.5	-	-	-	0.88	-	-	-	-	-	0.80	-	-	-	-	-	0.76	-	-	-	-	-	0.79	0.82
345.2	0.82	0.88	0.91	-	0.78	0.86	0.76	0.85	-	0.80	0.82	0.77	-	0.87	-	-	-	-	0.88	0.84	-	-	0.84
350.2	0.79	0.89	-	-	0.79	-	-	0.90	-	-	0.88	0.86	-	-	-	-	-	-	-	-	-	0.76	0.82
973.0	-	0.76	0.83	-	-	-	-	0.84	0.76	0.85	-	0.69	-	-	-	0.81	-	-	-	0.70	0.57	-	0.77
District Ratio	0.81	0.81	0.84	0.81	0.86	0.73	0.83	0.92	0.76	0.84	0.80	0.79	0.84	0.85	0.88	0.84	0.89	0.85	0.85	0.78	0.81	0.93	0.82

We however, come across larger variations in cost-price ratio in case of some of the individual industry groups. For this exercise, we consider only such industry groups which are found in at least half a dozen of the selected districts. Bakery and Milk-products yield an average ratio of 0.76; of the nine districts for which we have relevant figures, four, Kanpur, Aligarh, Allahabad and Jaunpur conform with the average, Gorakhpur shows a marginal disadvantage with a COR of 0.77. But Varanasi shows a distinct advantage with a COR of 0.70 and Bareilly, Moradabad and Saharanpur seem rather unfavourable locations for this industry to the extent one rupee of output in these districts costs Re 0.87, 0.86 and 0.84 respectively. Within the group Bakery and milk-products, biscuits also show similar variations; equal to the average of 0.76 in Kanpur and Aligarh; 0.78 in Allahabad, 0.73 in Varanasi but 0.87, 0.86 and 0.84 in Bareilly, Moradabad and Saharanpur.

Oil and Grain Mill Products is an industry with a rather high (0.85) COR and also shows wide variations in the ratio among districts. Although Kanpur, Agra, Allahabad and Bareilly show only small variations from the average,

Saharanpur, Varanasi, Sitapur and Moradabad show highly unfavourable figures at 0.97, 0.95, 0.94 respectively; while figure for Lucknow is highly favourable at 0.70 followed by that for Aligarh at 0.77. We have comparable figures for a few districts for mustard oil and ground nut oil within this group. While the former shows only marginal variations in COR, in the latter the differences are large. Production of one rupee worth of mustard oil costs 83 paise on an average, it costs 84 paise in Varanasi, 82 paise in Kanpur, 85 paise in Agra, 88 paise in Allahabad and 77 paise in Aligarh. Ground-nut oil costs 85 paise per rupee of output on an average, but it costs as high as 97 paise in Saharanpur; 93 paise in Agra and Sitapur and 92 paise in Moradabad; and as low as 70 paise in Lucknow.

Straw and Mill Board also has a high average COR at 0.86, but it is found ^{to} be the highest at 0.94 in Saharanpur and lowest at 0.74 in Varanasi and Aligarh. In Kanpur, Ghaziabad, Bijner, Muzaffarnagar and Unnao, it is not very different from the average. Cement and Hume Pipes show wide variations in cost per rupee of output : 0.91 in Lucknow, 0.90 in Gorakhpur, 0.87 in Mathura, 0.85 in Nainital, but only 0.64 in Allahabad, 0.68 in Varanasi, 0.72 in Meerut and 0.76 in Ghaziabad, against the State average of 0.83.

In casting and forging units one rupee of realised revenue entails a cost of Re. 0.82, on an average. In most of the districts the figure is lower or higher than the average by five paise or less, but it is lowest at 0.69 at Mirzapur followed by Lucknow at 0.71 and highest at 0.93 in Varanasi followed by Allahabad at 0.88. Within this group, industrial machinery units turn out a very favourable ratio at 0.72 in Gorakhpur, while in the three other districts Muzaffarnagar, Agra, and Ghaziabad, where we have sample units in this industry, the COR is not very different from the average of 0.82.

In another metal engineering group, nuts, bolts and metal containers, units in Kanpur, Agra, Ghaziabad, Lucknow, Aligarh and Allahabad, show a cost to output ratio very near the average of 0.88, but Saharanpur and Sitapur units have a highly unfavourable ratios of 0.97 and 0.96 respectively. ~~In~~ ^MMetal utensils units have the lowest ratio in Bijnore (0.76) and the highest ⁱⁿ ~~by~~ Agra (0.91). Varanasi, Ghaziabad, Moradabad, Muzaffarnagar and Aligarh are other districts with below average cost and Kanpur, Lucknow, Saharanpur, Mirzapur and Jaunpur with above average cost per rupee of output in this industry. In aluminium utensils

Aligarh, Bijnor and Ghaziabad score over other districts with a cost output ratio of below 0.80, while in brass utensils Moradabad alone has below average cost-price ratio at 0.80. Manufacture of agricultural machinery and equipment is found to cost the least in relation to value of output in Sitapur (COR = 0.76) followed by Varanasi and Meerut; and the highest in Saharanpur and Kanpur (COR = 0.90 in each).

Pattern of Comparative Advantage

We can now sum up the pattern of relative advantage shown by various districts in different lines of manufacture in terms of cost per unit of value of output, which reflects both the cost and the market dimensions of locational advantage and disadvantage. Overall, Lucknow, Dehradun, Gorakhpur, Muzaffarnagar and Aligarh provide the most advantaged location; Varanasi, Kanpur, Agra, Bijnor, Moradabad, Allahabad, Bareilly, Unnao, Mirzapur Mathura and Jaunpur offer average locational advantage; while Sitapur, Saharanpur, Bulandshahr, Nainital and Ghaziabad provide the least advantageous locations in that order. The first category of locations give roughly a surplus of 20 to 25 paise per rupee of market value of the product;

in the second category the surplus is between 15 to 20 paise per rupee and in the last category it is between 10 to 15 paise per rupee. Lucknow as the most advantageous location yields a surplus of 27 paise, and Sitapur and Saharanpur as the least advantaged locations seven and eight paise per rupee of output. These findings, however, relate to the overall industrial structure; relative position of different districts in respect of each of the selected industry groups is summarised below (Table V - 2).

Distance from Most Advantageous Location (MAL) and COR

The most advantageous location presumably has distinct favourable conditions on the availability of material, labour and other inputs at low prices, and/or provides markets or proximity to it so as to enable the producers to realise a higher value of output. In case there is a unique ideal location on these basis, the advantages of locations will tend to get reduced as we move away in space from such a location. Let us examine if such a situation is found to obtain in Uttar Pradesh, in the case of all and different industries. Are these districts which provide unique location solutions? And ^{does} the Advantages get reduced with distance from such locations?

Table V-2

LOCATIONAL ADVANTAGE OF DISTRICTS

Industry (with average cost-output ratio in parenthesis)	Districts with			
	Distinct Locational advan- tage	Average Location Conditions	Locational Disadvantage	
	1	2	3	4
1. Bakery and Milk Products (0.76)	Varanasi (0.71)	Kanpur (0.76), Aligarh (0.76), Allahabad (0.76), Jaunpur (0.76), Gorakhpur (0.77)	Saharanpur (0.84), Moradabad (0.86), Bareilly (0.87)	
Biscuits (0.76)		Varanasi (0.73), Kanpur (0.76), Allahabad (0.78)	Saharanpur (0.84), Mora- dabad (0.86), Bareilly (0.87)	
2. Oil and Grain Mill Products (0.85)	Lucknow (0.70) Aligarh (0.77)	Kanpur (0.82), Agra (0.81), Allahabad (0.87), Bareilly (0.88)	Varanasi (0.95), Saha- ranpur (0.97), Moradabad (0.94), Unnao (0.90), Sitapur (0.94)	
Mustard Oil (0.85)	Aligarh (0.77)	Varanasi (0.84), Kanpur (0.82), Agra (0.85)	Allahabad (0.88)	
Ground-nut oil (0.85)	Lucknow (0.70) Aligarh (0.79)	Bareilly (0.86), Unnao (0.89)	Agra (0.93), Saharanpur (0.97), Moradabad (0.92), Sitapur (0.93)	
3. Straw Board Mill Board (0.86)	Varanasi (0.74) Aligarh (0.74) Unnao (0.77)	Kanpur (0.86), Ghaziabad (0.90), Bijnor (0.88), Muzaffarnagar (0.88)	Saharanpur (0.94)	
4. Cycle Tyres Tubes (0.81)	Varanasi (0.73), Muzaffarnagar (0.74)	Kanpur (0.80), Meerut (0.81), Ghaziabad (0.85), Saharanpur (0.86)		
Cycle Tubes (0.79)	Varanasi (0.73) Muzaffarnagar (0.74)	Kanpur (0.80), Meerut (0.80), Ghaziabad (0.83)	Saharanpur (0.86)	

LOCATIONAL ADVANTAGE OF DISTRICTS

1	2	3	4
5. <u>Chemicals</u> (0.82)	Varanasi (0.75)	Kanpur (0.82), Mathura (0.78)	Ghaziabad (0.96)
<u>Drugs</u> (0.82)	Mathura (0.78)	Kanpur (0.84)	
<u>Industrial Gases</u> (0.74)		Varanasi (0.75), Kanpur (0.74)	
<u>Paints</u> (0.84)		Kanpur (0.82)	Ghaziabad (0.93)
6. <u>Glass Products</u> (0.84)	Lucknow (0.75)	Agra (0.85)	Allahabad (0.87)
<u>Glass Bottles</u> (0.87)		Agra (0.87), Allahabad (0.87)	
7. <u>China-ware</u> (0.83)	Agra (0.71)		Bulandshahr (0.89)
8. <u>Cement and</u> <u>Hume Pipes</u> (0.81)	Meerut (0.72), Varanasi (0.68), Ghaziabad (0.76) Allahabad (0.64)	Mainital (0.85)	Lucknow 0.91) Mathura (0.87), Gorakhpur (0.90)
9. <u>Casting and</u> <u>Forging</u> (0.82)	Lucknow (0.71), Mirza- pur (0.69), Gorakhpur (0.72)	Kanpur 0.87), Agra (0.78), Meerut (0.86), Ghaziabad (0.82), Bijnor (0.81), Moradabad (0.79), Muzaffarnagar (0.83), Aligarh (0.82), Mathura (0.80), Jaunpur (0.82), Unnao (0.85)	Varanasi (0.93), Saharanpur (0.91), Allahabad (0.88), Bareilly (0.89)

LOCATIONAL ADVANTAGE OF DISTRICTS

1	2	3	4
10. <u>Industrial Machinery</u> (0.82)	Corakhpur (0.72)	Muzaffarnagar (0.81), Ghaziabad (0.83), Agra (0.83)	
11. <u>Steel Pipes</u> (0.84)	Unnao (0.79)	Kanpur (0.82), Agra (0.87), Ghaziabad (0.83), Saharanpur (0.88)	Nainital (0.92)
12. <u>Nuts, Bolts and Metal Containers</u> (0.88)		Kanpur (0.86), Agra (0.88), Ghaziabad (0.89), Lucknow (0.87), Aligarh (0.84), Allahabad (0.84)	Saharanpur (0.97), Sitapur (0.96)
13. <u>Agriculture Implements</u> (0.85)	Ghaziabad (0.77), Moradabad (0.79), Unnao (0.79)	Varanasi (0.89), Kanpur (0.89), Agra (0.81), Meerut (0.88), Bijnor (0.84), Muzaffarnagar (0.87), Aligarh (0.87), Bareilly (0.81)	Saharanpur (0.90)
14. <u>Metal Utensils</u> (0.84)	Ghaziabad (0.78), Bijnor (0.76), Aligarh (0.77)	Varanasi (0.82), Kanpur (0.88), Lucknow (0.86), Saharanpur (0.85), Moradabad (0.80), Muzaffarnagar (0.82), Mirzapur (0.87), Jaunpur (0.88), Gorakhpur (0.88)	Agra (0.91)
15. <u>Aluminium Utensils</u> (0.84)	Bijnor (0.76), Aligarh (0.74)	Varanasi (0.83), Kanpur (0.84), Ghaziabad (0.79), Lucknow (0.86), Muzaffarnagar (0.87), Jaunpur (0.88), Gorakhpur (0.88)	Agra (0.91)
<u>Brass Utensils</u> (0.84)		Agra (0.87), Bijnor (0.86), Moradabad (0.80), Aligarh (0.85), Mirzapur (0.86)	Kanpur (0.91)

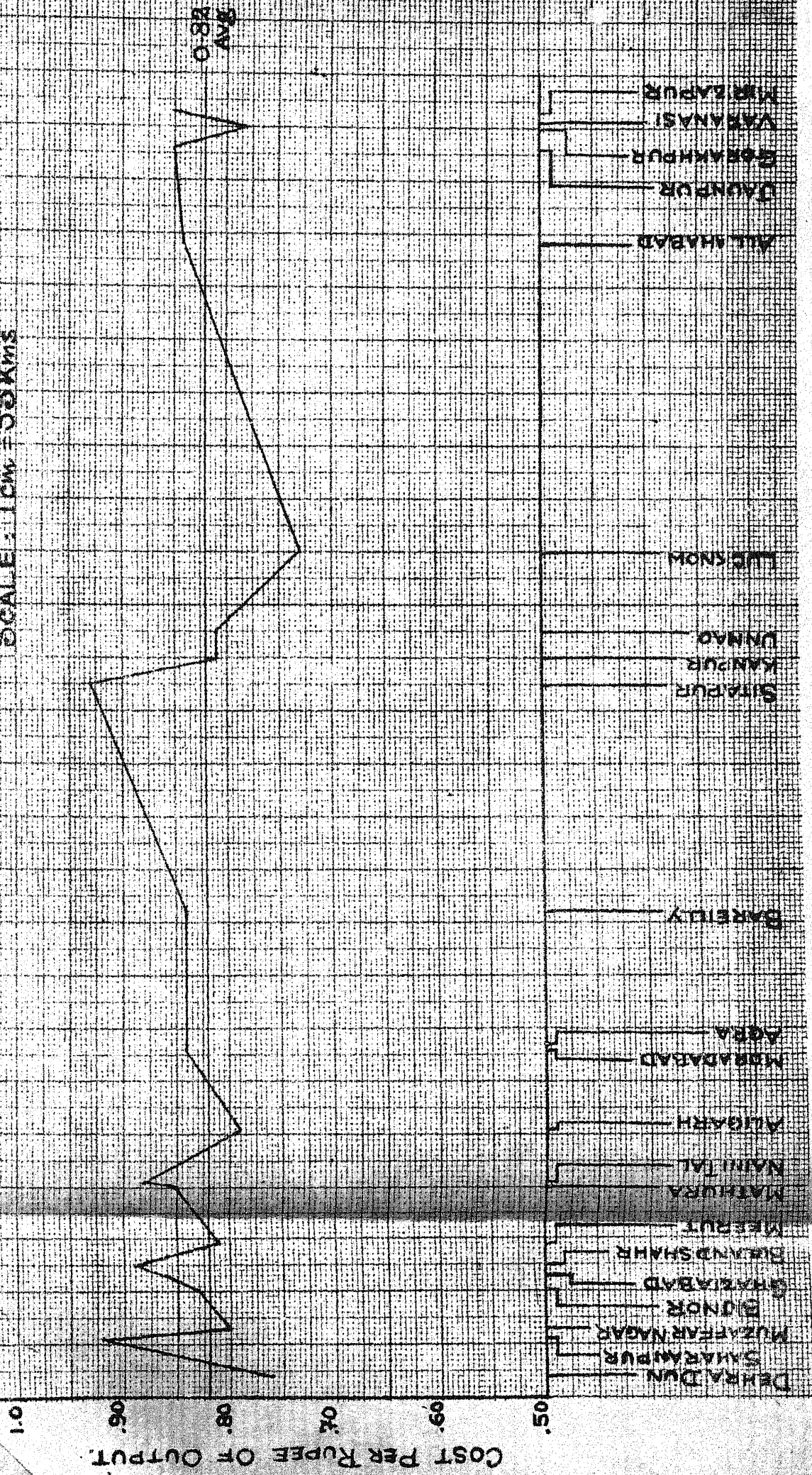
LOCATIONAL ADVANTAGE OF DISTRICTS

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
15. <u>Agricultural Machinery and Equipment</u> (0.82)	Sitapur (0.76)	Varanasi (0.79), Ghazilabad (0.79), Aligarh (0.86)	Kanpur (0.89), Saharanpur (0.90), Muzaffarnagar (0.88)
16. <u>Repair of Motor Vehicles</u> (0.77) YYYYYY	Aligarh (0.69), Gorskhpur (0.70), Unao (0.57)	Kanpur (0.76), Dehradun (0.76), Bareilly (0.81)	Agra (0.83), Saharanpur (0.84), Moradabad (0.85)
<u>Threshers</u> (0.92)	Bijnor (0.80), Moradabad (0.76), Muzaffarnagar (0.80)	Varanasi (0.94), Kanpur (0.89), Aligarh (0.91)	

FIGURE 1

DISTRICTWISE COST PER RUPEE OF OUTPUT - ALL INDUSTRY

SCALE : 1cm = 35 kms



We have attempted answer to these questions by plotting COR of each location on a graph measuring distance on the horizontal axis. Lucknow is taken to be the Centre and other districts are placed on its right and left in line with their actual distance from Lucknow. Space is treated as a linear variable on the two-dimensional figures, but all districts located west of Lucknow are on the left and those located in the east are on the right of Lucknow.

In the aggregate, all industries situation, Lucknow represents the most advantageous location (MAL) (Figure 1). To some extent, ~~in space~~ locations away from Lucknow on either side have increasing trend in COR in line with distance. But this tendency is not continued over the entire space. Varanasi in the east and Aligarh, Meerut and Muzaffarnagar in the west provide other locations with low COR. Roughly, therefore, there appear to be not one, but three troughs in the COR plotted over the space, suggesting three different clusters of districts, each with its own central point in terms of the MAL.

FIGURE 2
COST PER RUPEE OF OUTPUT — INDUSTRY 205.3

[Bakery & Milk Products]

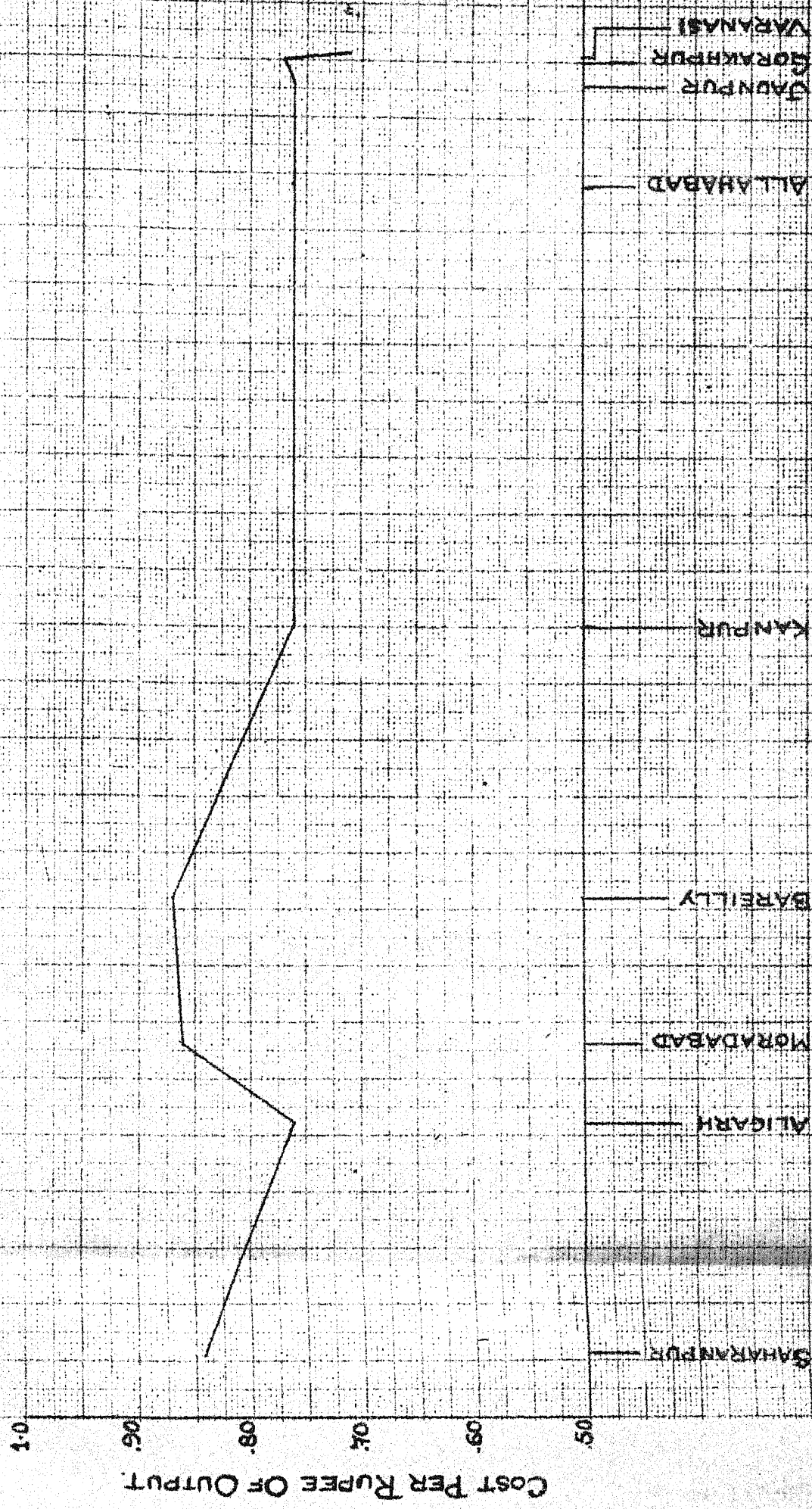


FIGURE-3

COST PER RUPEE OF OUTPUT — INDUSTRY 211.0

Oil & Grain Mill Products

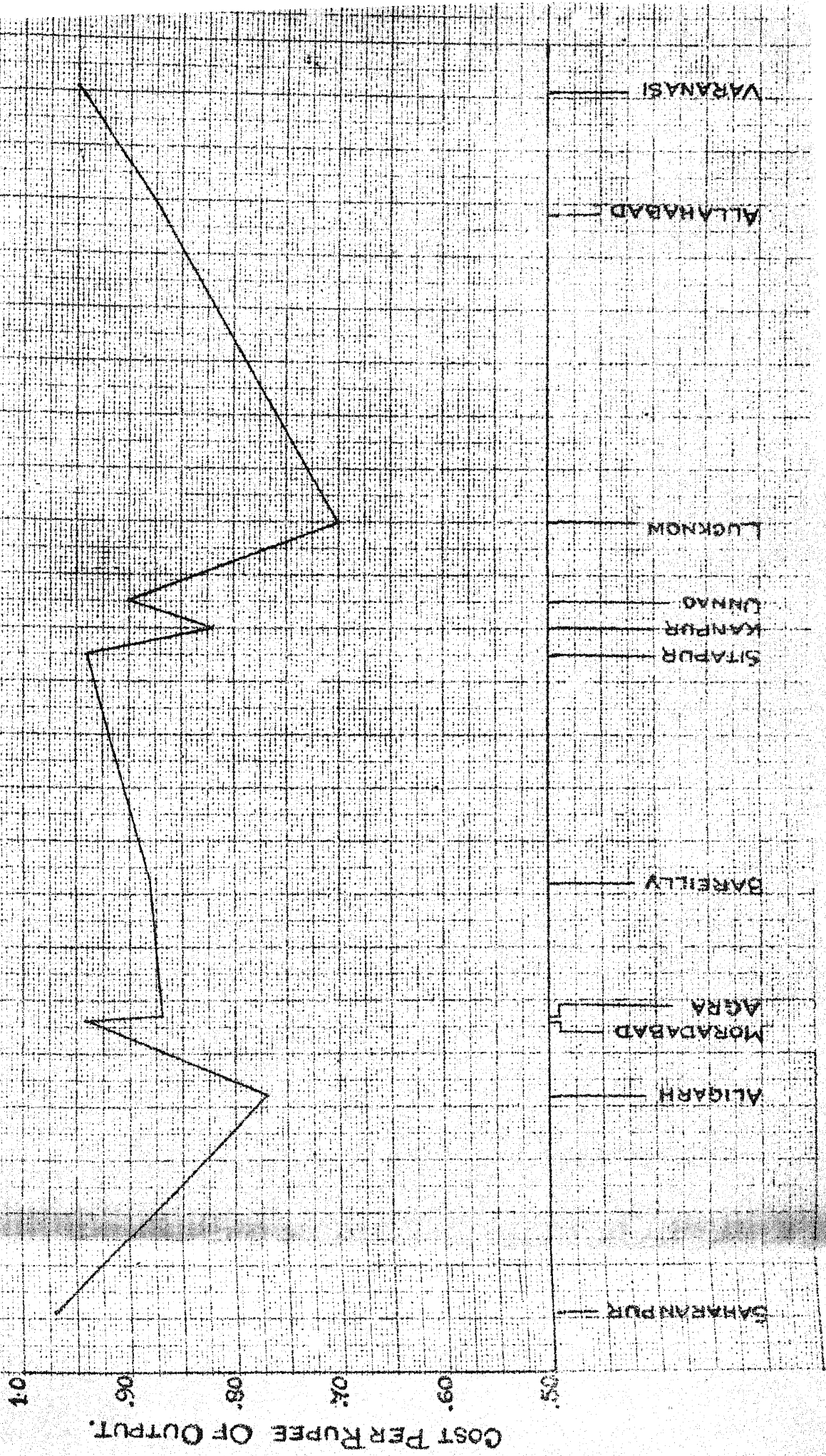
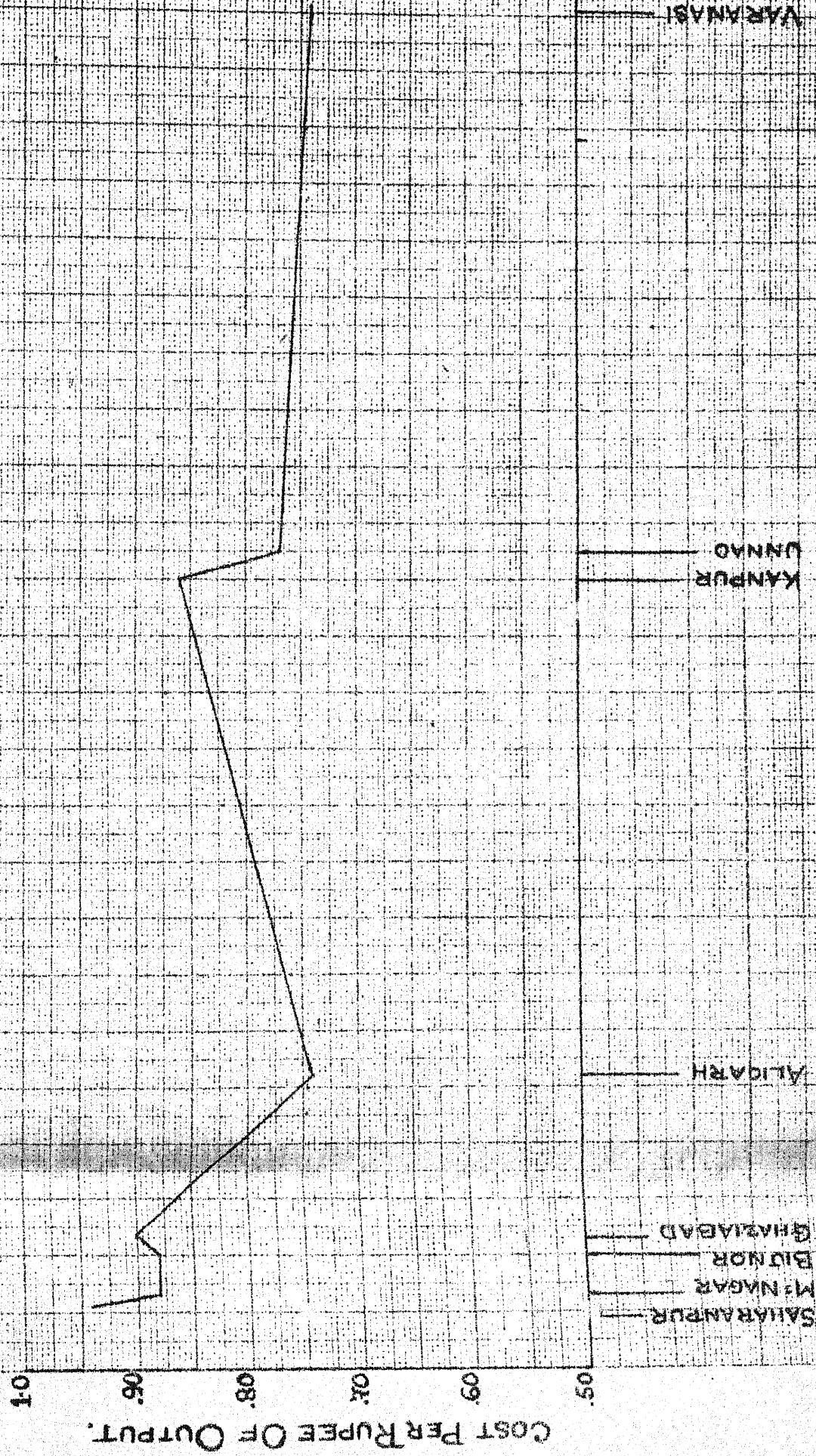


FIGURE 4

COST PER RUPEE OF OUTPUT — INDUSTRY 280.5

Strawboard & Millboard



COST PER RUPEE OF OUTPUT — INDUSTRY COST — [Cent & Hume] spec.

COST PER RUPEE OF OUTPUT.

01

06

08

04

09

05

GUANABO
MEERUT
MATHURA
NAINITAL

LUCKNOW

ALLAHABAD

GORAKHPUR

VANAKHATA

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For the industry group, bakery and milk products distance from the MAL, namely Varanasi, shows a decline in advantage as COR increases as one moves West, till one reaches Aligarh which offers another favourable location (Figure 2). Thus Varanasi and Aligarh emerge as the two idea locations, distance from each of them tends to increase COR, till, of course one comes in the proximity of the other. In Oil and grain mill products (Figure 3) the central parts of U.P. provide distinct advantage over the extreme east and west; Lucknow offers the MAL, but Aligarh also seems to provide another ideal location in the western region. Similarly in the manufacture of straw-board and mill-board Varanasi and Aligarh offer relative advantage in the east and west respectively, distance from either district within the respective ^{region} ~~region~~ tends to yield a increasingly higher COR (Figure -4). For Cement and Hume pipes, again eastern and western parts of U.P. have two different MAL, Allahabad in the east and Meerut in the West (Figure -5).

In Casting and Forging Lucknow provides the MAL, but the COR does not show a continuous tendency to increase with distance in either direction. Gorakhpur seems an

FIGURE-6
Cost per Rupee of Output - Industry 331.1

[Casting & Forging.]

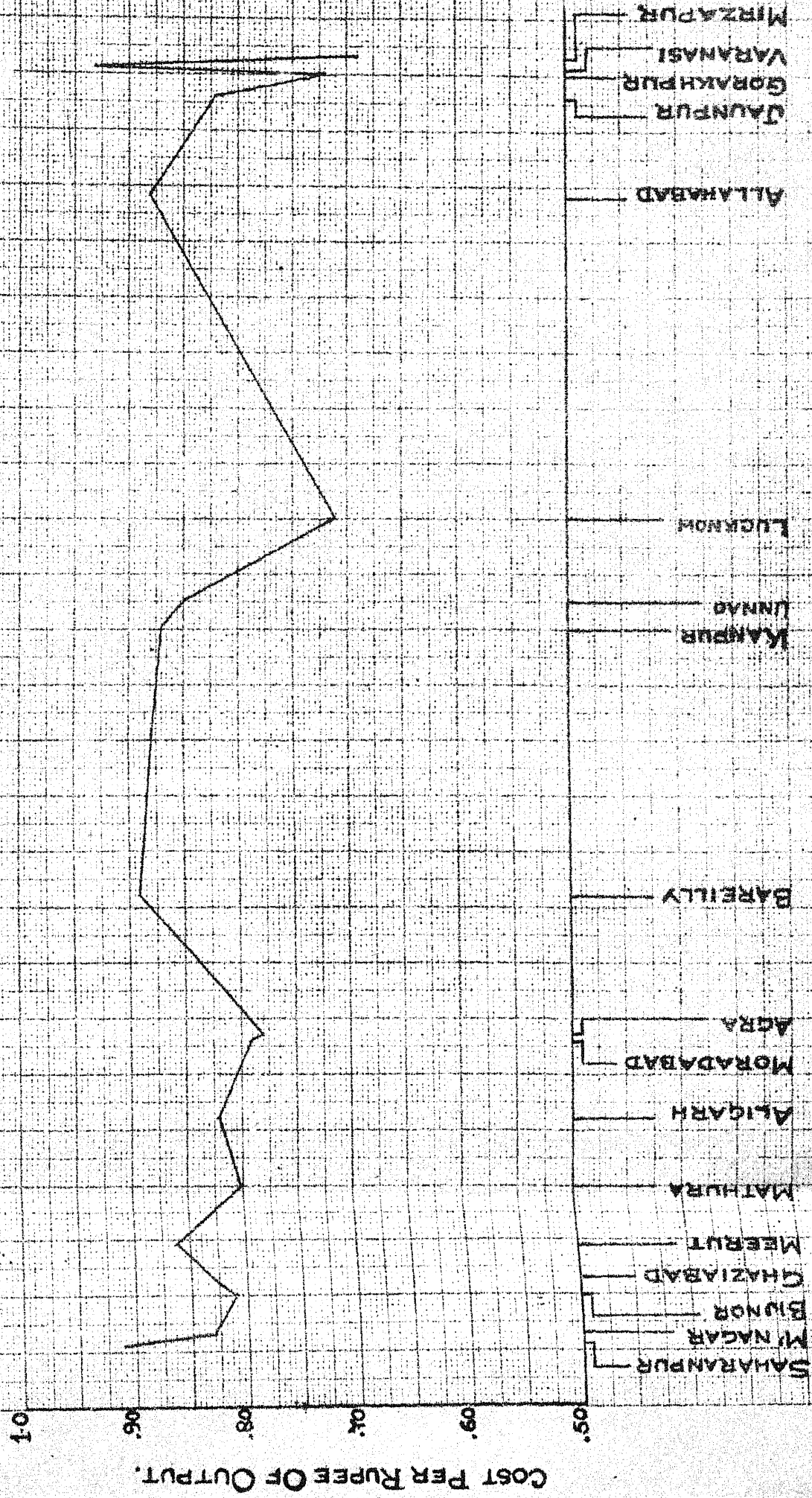


FIGURE-2
Cost Per Rupee of Output — INDUSTRY 340-3
[Nuts and Bolts]

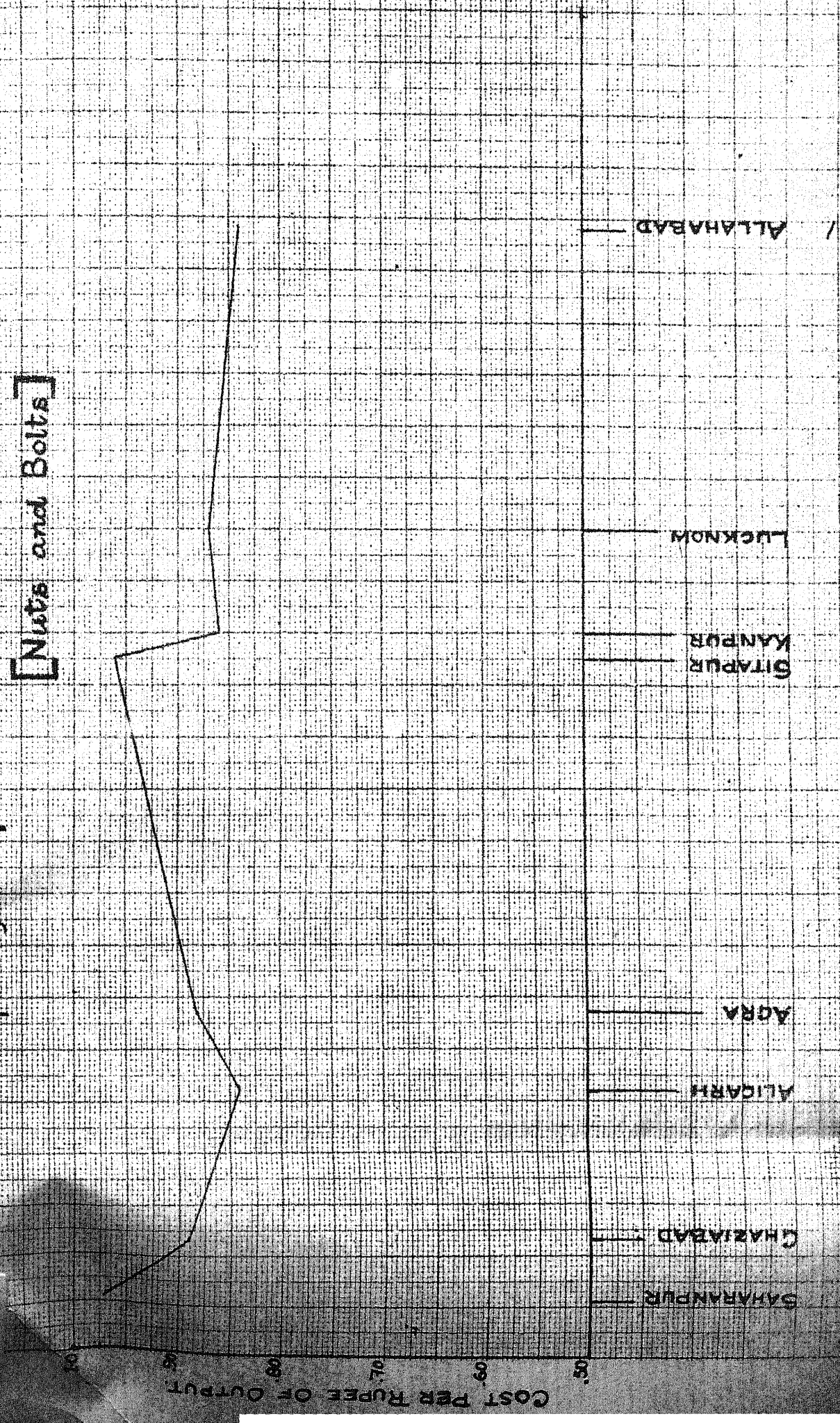


FIGURE 3

COST PER RUPEE OF OUTPUT — INDUSTRY 345.2

[Metal Utensils]

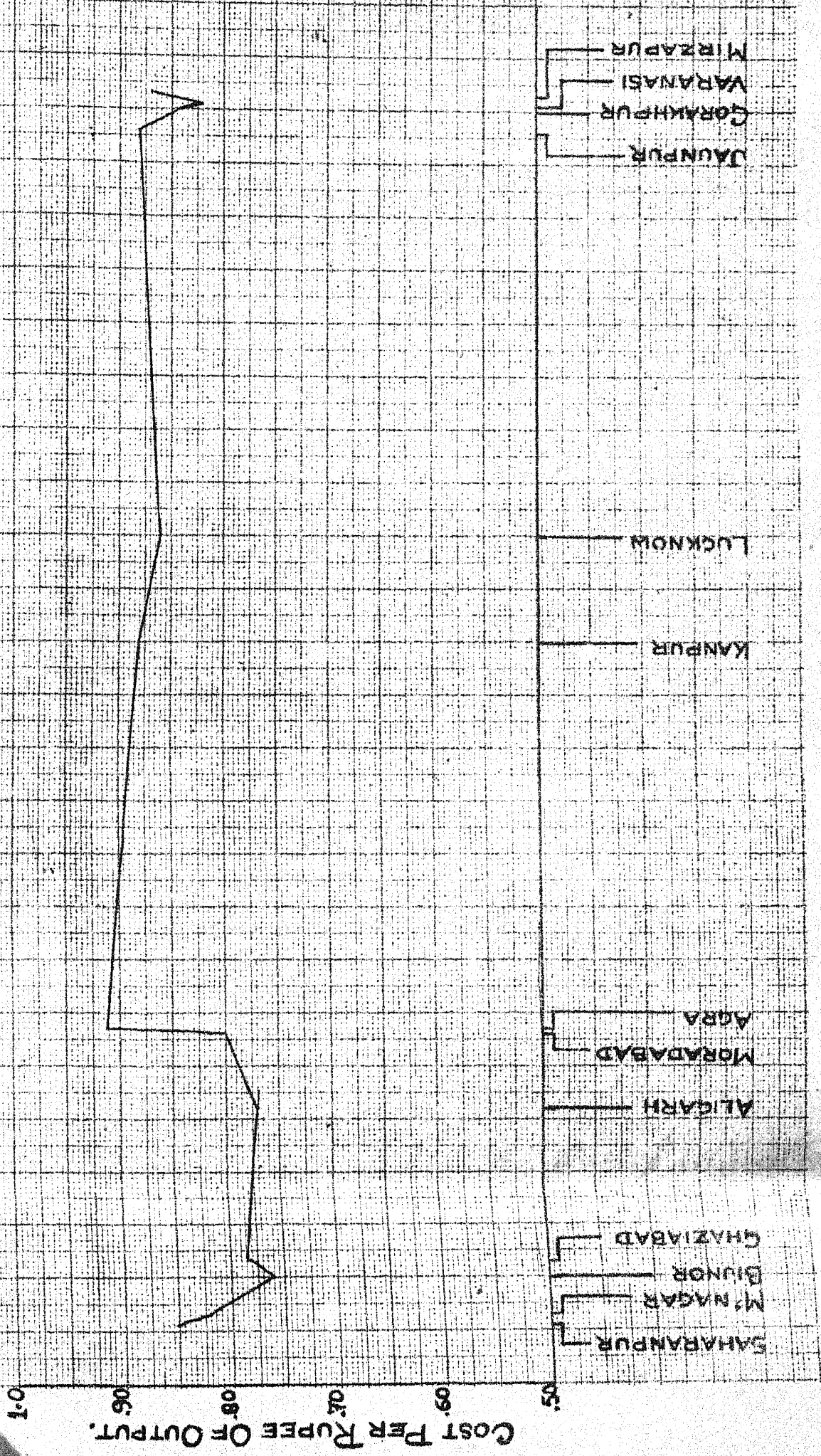


FIGURE - 9
COST PER RUPEE OF OUTPUT - INDUSTRY 350.2

[Light Agric. Machinery]

COST PER RUPEE OF OUTPUT

1.0

0.6

0.8

0.4

0.9

0.5

SAHARANPUR

MUNAGAR

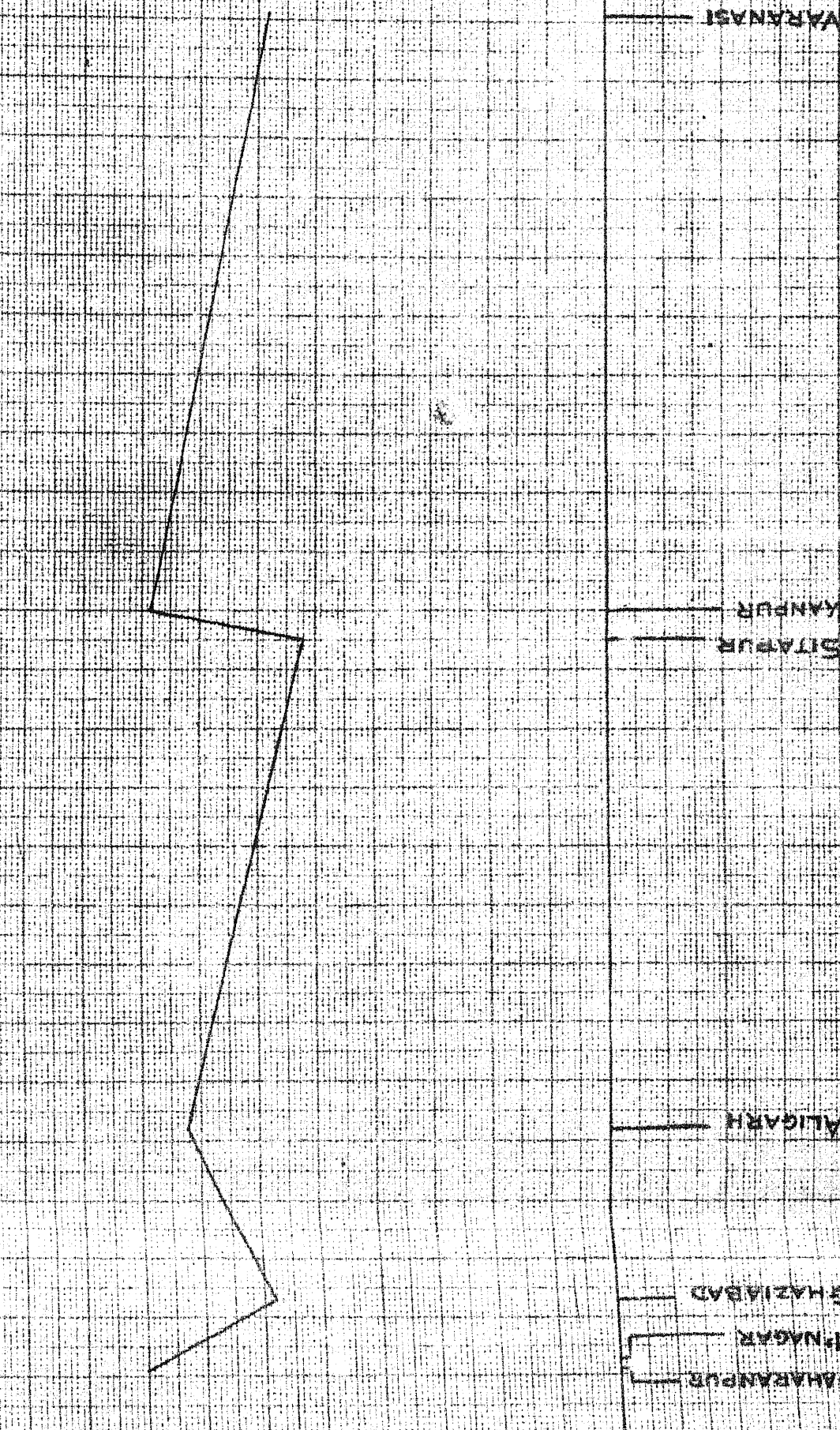
GHAZIABAD

ALIGARH

SITAPUR

KANPUR

VARANASI



independent MAL ⁱⁿ ~~for~~ the eastern region and Agra and Moradabad in the western region (Figure -6). For the manufacture of nuts and bolts Allahabad ^{provide MAL} and Aligarh in the east and west respectively, the central and extreme western parts of the State show a higher COR more or less in relation to the distance from these two locational points (Figure -7). In the production of metal utensils Bijnor provides the MAL, the districts nearer it Moradabad, Aligarh, Ghaziabad and Muzaffarnagar show slightly higher COR but, the more distant locations show significantly higher COR (Figure -8). In the east Varanasi shows better advantage than the other districts in the region as well as in the central parts. In the manufacture of light agricultural machinery Sitapur provides the MAL, but as can be seen from Figure -9, there seem three different advantageous locations for each of the eastern, central and western regions; Varanasi, Sitapur and Muzaffarnagar respectively.

The above pattern of the MAL for different industries and behaviour of COR in relation to the distance from each MAL suggests that in most of the industries the entire

State cannot be taken as one spatial unit for the analysis and policy on location. It is found that there is no unique ideal location for any industry; but there are different advantageous locational points for different parts, at least for the Eastern, Central and Western parts. It seems that the markets for raw materials which is the major cost-item in all industries are regional in character, and even the markets for the products are so to some extent. For most industry^{ies}, therefore, there seem to be more than one MAL points, broadly one in each of the three regions; in some cases, of course, only two regions could be identified. These points seem to provide the stimulus for growth of a given industry, other locations in the region offer lesser advantages.

The pattern of the MAL and COR behaviour over space has some useful implications for policy on incentives and subsidies for the industrial development of backward areas. Basically, these instruments are used to compensate the less advantaged location so as to bring its COR to the level of the MAL. For this purpose it is necessary that incentives and subsidies are graded by the degree of disadvantage of different locations. The degree of disadvantage of a location could be measured in terms of the excess

of COR of a location over that of the MAL. In the case of Uttar Pradesh the principle could be applied on a regional basis and disadvantages could be measured in relation to the MAL of the region. To the extent the difference in COR from the MAL is in line with distance from it, the implementation of the instruments of incentives and subsidies gets simplified as, in that case their magnitude could be related to the distance from the MAL of the region.

Cost-Components and COR

Let us now examine which of the cost items make a location advantageous or other-wise. For this purpose we have only indirect data on raw material and labour input for different industries and location, in terms of the cost of these inputs as a proportion of the value of output. Price per unit of input could probably be a more direct indicator for assessing comparative advantage in terms of each input; but such information could not be reliably collected for raw material, although for labour we have average wages per worker which have also been used in this analysis.

Raw material makes the major component of value of product in all industries : the average material output ratio (MOR) for all industries is 67 per cent, but it is high in bolts, nuts and metal containers (75%), oil and grain mill products (73%) and cycle tyres and tubes (71%), and rather low in chemicals (48%), chinaware (50%), repair of motor vehicles (55%), and glass products (58%) (Table V - 3). In all other industry groups MOR ranges between 60 and 70 per cent. Among districts, the combined ratio for all industries in the district included in the sample, is high in Sitapur (89%), Mirzapur (78%), Nainital (76%), Meerut (74%) and Saharanpur (72%); and low in Dehradun (52%), Muzaffarnagar (54%), Gorakhpur (53%), Unnao (55%) and Bulandshahr (56%).

Nuts, bolts and metal containers is the most raw material intensive industry with a MOR of 0.75, but the ratio is low at 0.57 in Lucknow, and ^{very high} at 0.89 in Sitapur in this industry. The next material intensive industry, oil grain mill products have an average MOR of 0.73; the ratio is only 0.55 in Kanpur and 0.65 in Aligarh, but 0.90 in Sitapur and 0.88 in Varanasi. Cycle tyres and tubes have an average MOR of 0.71, but it is only 0.49 in Muzaffarnagar and 0.61 in Varanasi.

Table - V - 3
Raw Material to Output Ratios (ROR)

District	Industry	Varanasi	Kanpur	Agra	Meerut	Ghaziabad	Lucknow	Bijnor	Saharanpur	Dehra Dun	Moradabad	Muzaffarnagar	Aligarh	Allahabad	Mirzapur	Naimitai	Bareilly	Bulandshahr	Mathura	Jaunpur	Gorakhpur	Unao	Sitapur	Industry Ratio
205.3		0.57	0.63	-	-	-	-	-	0.73	-	0.48	-	0.54	0.57	-	-	0.55	-	-	0.52	0.54	-	-	0.63
211.0		0.88	0.55	0.74	-	-	0.67	-	0.69	-	0.83	-	0.65	0.80	-	-	0.76	-	-	-	-	0.85	0.90	0.73
280.5		0.47	0.70	-	-	0.39	-	0.70	0.67	-	-	0.53	0.67	-	-	-	-	-	-	-	-	0.35	-	0.64
300.3		0.61	0.62	-	0.76	0.72	-	-	0.69	-	-	0.49	-	-	-	-	-	-	-	-	-	-	-	0.70
310.1		0.42	0.47	-	-	0.70	-	-	-	-	-	-	-	-	-	-	-	-	0.57	-	-	-	-	0.48
321.1		-	-	0.63	-	-	0.44	-	-	-	-	-	-	0.43	-	-	-	-	-	-	-	-	-	0.58
323.1		-	-	0.37	-	-	-	-	-	-	-	-	-	-	-	-	-	0.56	-	-	-	-	-	0.50
329.1		0.56	-	-	0.50	0.68	0.62	-	-	-	-	-	-	0.37	-	0.74	-	-	0.78	-	0.57	-	-	0.68
331.1		0.83	0.66	0.63	0.58	0.62	0.52	0.70	0.69	-	0.61	0.70	0.64	0.49	0.60	-	0.70	-	0.68	0.56	0.36	0.65	-	0.63
331.3		-	0.64	0.71	-	0.64	-	-	0.85	-	-	-	-	-	-	0.81	-	-	-	-	-	0.56	-	0.66
340.3		-	0.74	0.75	-	0.74	0.57	-	0.88	-	-	-	0.73	0.76	-	-	-	-	-	-	-	-	0.89	0.75
343.5		-	-	-	0.53	-	-	-	-	-	0.63	-	-	-	-	-	0.54	-	-	-	-	0.63	-	0.66
345.2		0.60	0.59	0.79	-	0.66	0.61	0.62	0.70	-	0.67	0.60	0.65	-	0.81	-	-	-	-	0.66	0.60	-	-	0.63
350.2		0.66	0.70	-	-	0.57	-	-	0.78	-	-	0.57	0.69	-	-	-	-	-	-	-	-	-	0.57	0.65
973.0		-	0.56	0.68	-	-	-	-	0.66	0.52	0.62	-	0.45	-	-	-	0.46	-	-	-	0.50	0.16	-	0.55
District Ratio		0.65	0.60	0.70	0.70	0.69	0.61	0.63	0.72	0.52	0.70	0.54	0.66	0.68	0.78	0.76	0.61	0.56	0.75	0.59	0.55	0.55	0.89	0.67

On the other hand, even in an industry like chemicals with low material intensity, Ghaziabad units have to spend 70 per cent of their output value on material, whereas the percentages is as low as 42 in Varanasi and Kanpur. In another less material intensive industry, china-ware, Bulandshahr units have a MOR of 0.59 while those in Agra only 0.37. Casting and forging with 0.63 as average MOR shows wide variation : ranging from 0.36 in Gorakhpur to 0.83 in Varanasi, but this is an industry with variegated structure of products, and different districts have highly different product structures. Considering a less aggregative product group within this industry, namely industrial machinery, the variations in MOR are found to be much less between 0.72 in Gorakhpur to 0.83 in Varanasi and Ghaziabad. In other product groups the variations are, though significant, not very wide.

Wage cost is found to be rather a small part (7 per cent) of the value of output in aggregate (Table V - 4). Yet units in glass products, china-ware, chemicals, agriculture machinery and equipment, repair of motor vehicles, straw board products and agricultural hand tools and implements have high wages to output ratio (WOR) of 0.20, 0.19, 0.15, 0.13, 0.12, 0.12 and 0.10 respectively; and

Table - V - 4
Wages to Output Ratio (WOR)

Industry	Varanasi	Kanpur	Agra	Meerut	Ghaziabad	Lucknow	Bijnor	Saharanpur	Dehra Dun	Moradabad	Muzaffar-Nagar	Aligarh	Allahabad	Mirzapur	Naimitai	Barilly	Buland-shahr	Mathura	Jampur	Gorakhpur	Unao	Sitapur	Industry
203.3	0.09	0.06	-	-	-	-	-	0.10	-	0.30	-	0.10	0.09	-	-	0.25	-	-	0.17	0.16	-	-	0.27
211.0	0.04	0.01	0.09	-	-	0.01	-	0.11	-	0.04	-	0.04	0.04	-	-	0.08	-	-	-	-	0.02	0.01	0.03
260.5	0.11	0.13	-	-	0.17	-	0.14	0.17	-	-	0.18	0.03	-	-	-	-	-	-	-	-	0.30	-	0.42
300.3	0.09	0.07	-	0.05	0.04	-	-	0.09	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	0.05
310.1	0.16	0.16	-	-	0.08	-	-	-	-	-	-	-	-	-	-	-	-	0.10	-	-	-	-	0.15
321.1	-	-	0.18	-	-	0.18	-	-	-	-	-	-	0.30	-	-	-	-	-	-	-	-	-	0.20
323.1	-	-	0.24	-	-	-	-	-	-	-	-	-	-	-	-	-	0.16	-	-	-	-	-	0.19
329.1	0.10	-	-	0.16	0.48	0.15	-	-	-	-	-	-	0.12	-	0.03	-	-	0.06	-	0.27	-	-	0.09
331.1	0.08	0.12	0.07	0.20	0.09	0.05	0.06	0.09	-	0.09	0.09	0.06	0.16	0.08	-	0.08	-	0.07	0.22	0.22	0.07	-	0.09
331.3	-	0.07	0.03	-	0.07	-	-	0.13	-	-	-	-	-	-	0.09	-	-	-	-	-	0.11	-	0.07
340.3	-	0.07	0.06	-	0.07	0.21	-	0.08	-	-	-	0.06	0.04	-	-	-	-	-	-	-	-	0.05	0.17
343.3	-	-	-	0.22	-	-	-	-	-	0.08	-	-	-	-	-	0.07	-	-	-	-	0.10	-	0.10
343.2	0.12	0.09	0.06	-	0.07	0.14	0.06	0.06	-	0.06	0.12	0.06	-	0.02	-	-	-	-	0.12	0.07	-	-	0.07
350.2	0.11	0.09	-	-	0.16	-	-	0.07	-	-	0.14	0.13	-	-	-	-	-	-	-	-	-	-	0.12
373.0	-	0.14	0.09	-	-	-	-	0.17	0.20	0.15	-	0.15	-	-	-	0.19	-	-	-	0.06	0.34	-	0.12
Industry Ratio	0.13	0.08	0.09	0.04	0.07	0.05	0.07	0.12	0.20	0.07	0.10	0.06	0.08	0.03	0.08	0.08	0.16	0.07	0.14	0.08	0.07	0.02	0.07

oil and grain mill products and cycle tyres and tubes a WOR of 0.05 or less. Among districts, Dehradun shows the highest WOR of 0.20 followed by Bulandshahr and Jaunpur at 0.14, Varanasi at 0.13; and Saharanpur at 0.12 and, Mirzapur has the lowest at 0.03 followed by Meerut at 0.04 and Lucknow at 0.04. Obviously, a large part of these differences are due to different industrial structure of districts. But even within an individual group, the differences are sometimes inexplicably large. In bakery products, Moradabad and Bareilly units pay 30 and 25 per cent of the value of output as wages to workers, while the percentage is only 6 in Kanpur and 9 in Varanasi and Allahabad. In straw board and straw-mill products the ratio ranges from 0.03 in Aligarh to 0.30 in Unnao; in cement and hume pipes between 0.06 in Mathura and 0.48 in Ghaziabad; in casting and forging between 0.05 in Lucknow and 0.22 in Jaunpur and Gorakhpur; in nuts, bolts and metal containers between 0.04 in Allahabad and 0.21 in Lucknow; and in repair of motor vehicles between 0.6 in Gorakhpur to 0.34 per cent in Unnao.

Overall, it seems that the COR is more in line with the MOR; primarily due to the dominance of raw material cost in almost all product groups. The WOR might vary among

districts due to variations in product structure and technology in a given product, or due to inter-district differences in wage rates. The average wage for the entire sample works out to Rs.3184 per worker per annum. (Table V-5). Mathura has the highest wage at Rs.4043 followed by Kanpur at Rs.3761, Ghaziabad at Rs.3637 and Varanasi Rs.3453. At the other end, Bulandshahr pays the lowest wage at Rs.1396, Bijnor Rs.1458, Jaunpur Rs.2014, Meerut Rs.2325. Wage rates are found to vary less across industries than districts. Average wages in industries range mostly between Rs.2400 and Rs.3600, with, of course, glass products and chemicals paying much higher at Rs.6045 and 4491 respectively and china-ware paying the lowest at Rs.1744. But within an industry also wages vary significantly, for example, between Rs.1293 in Varanasi and Rs.3496 in Kanpur in bakery and milk products; between Rs.955 in Unnao and Rs.4833 in Agra, in oil and grain mill products; between Rs.970 in Ghaziabad and Rs.5714 in Muzaffarnagar in straw board and mill board; and between Rs.930 in Ghaziabad and Rs.6744 in Varanasi, in chemicals.

Table V - 2 : Wages per Worker (W)

Industry	Varanasi	Kanpur	Aligarh	Meerut	Ghaziabad	Lucknow	Bijnor	Saharanpur	Dehradun	Moradabad	Muzaffarnagar	Aligarh
1	2	3	4	5	6	7	8	9	10	11	12	13
205.3	1292.60	3496.26	-	-	-	-	-	1790.90	-	2700.00	-	2679.94
211.0	2855.17	2931.54	4833.20	-	-	3227.27	-	2598.88	-	4404.21	-	2569.39
280.5	2823.82	3158.36	-	-	970.00	-	2329.36	2796.87	-	-	5714.46	2941.18
300.3	3356.77	3002.91	-	2031.36	2169.46	-	-	3379.96	-	-	2211.01	3087.00
310.1	6744.44	5076.03	-	-	930.30	-	-	-	-	-	-	-
321.1	-	-	2031.58	-	-	2087.49	-	-	-	-	-	-
323.1	-	-	2775.43	-	-	-	-	-	-	-	-	-
329.1	3687.25	-	-	5318.93	2283.41	2058.82	-	-	-	-	-	-
331.1	3460.80	2394.26	3376.03	2659.35	4561.55	2764.46	1049.20	3398.91	-	2235.61	2348.48	2069.68
331.3	-	2808.11	2899.75	-	5066.84	-	-	2301.37	-	-	-	-
340.3	-	3572.97	2952.99	-	3557.71	9300.00	-	4077.52	-	-	-	2494.90
343.5	-	-	-	2963.57	-	-	-	-	-	2615.03	-	-
345.2	2268.18	1977.63	3107.77	-	2975.17	2037.98	2062.50	3237.07	-	2813.54	1921.20	3193.00
350.2	2583.30	2473.32	-	-	4814.01	-	-	2492.67	-	-	2487.50	3807.79
973.0	-	2923.91	2325.51	-	-	-	-	4116.00	2790.22	3135.29	-	3066.79
Industry Ave.	3453.16	3760.34	2814.03	2324.85	3637.42	3008.25	1958.19	2947.00	2790.22	2863.30	3117.97	2971.65

Table V - 2 (contd...)

District	14	15	16	17	18	19	20	21	22	23	24
Industry	Alameda	Kirzapur	Monte	Merced	Butte	Mathura	San Diego	San Diego	San Diego	San Diego	San Diego
205.3	2569.39	-	-	2700.00	-	-	1435.71	3256.56	-	-	3159.77
211.0	2375.34	-	-	2783.49	-	-	-	-	954.82	2281.10	2923.82
280.5	-	-	-	-	-	-	-	-	2556.30	-	2994.92
300.3	-	-	-	-	-	-	-	-	-	-	2392.11
310.1	-	-	-	-	-	2491.00	-	-	-	-	1490.74
321.1	2144.65	-	-	-	-	-	-	-	-	-	5043.24
323.1	-	-	-	-	1396.24	-	-	-	-	-	1744.20
329.1	2122.80	-	2723.13	-	-	4665.20	-	2072.72	-	-	3444.96
331.1	3136.60	2490.83	-	3480.60	-	3206.41	2179.95	1983.91	5037.06	-	3542.74
331.3	-	-	3483.20	-	-	-	-	-	3016.68	-	5765.16
340.3	3656.82	-	-	-	-	-	-	-	-	3061.23	3555.47
343.5	-	-	-	1867.76	-	-	-	-	2767.39	-	2601.03
345.2	-	2089.69	-	-	-	-	2032.08	2317.76	-	-	2405.04
350.2	-	-	-	-	-	-	-	-	-	2318.35	3369.62
973.0	-	-	-	3468.08	-	-	-	3550.09	1899.00	-	2955.34
District Ave.	2635.01	2217.71	2971.86	3016.69	1396.24	4042.85	2014.10	2590.05	2462.36	2409.34	3104.1

Cost Ratios and Location

Let us now see how far new industrial activity generated in each of the districts during 1960-75 is related with the measures of locational advantages that we have drawn above. We have two measures of additions to industrial activity : new factory units started (AU) and net increase in employment (AE) over the period. One presumes that if adequate information is available the entrepreneurs' decisions to locate and expand their activity in a district would be influenced by what they would expect to get as surplus of revenue over cost, which can be inversely measured in terms of the cost-output ratio; and that would depend mainly on what part of the value of their output they expect to have to be paid for raw material and wages.

It, however seems that the location of new industrial activity does not bear any consistent relationship with the pattern locational advantage of districts as portrayed earlier. The new industrial activity measured in terms of factories added (AU) and increase in employment (AE), when regressed upon COR does not show any consistent relationship, implying that the distribution of new industrial activity among districts is not necessarily influenced by the

locational advantages of districts as reflected in cost output ratio (COR). The explanatory power of the model as shown by the value of R^2 is generally low in all-industry equation as well as in those for individual industries (Table V - 6). (The analysis is restricted only to 8 industry groups in which there at least seven observations). In the equation for all-industry, bakery and milk products and nuts and bolts the sign of coefficients is negative as expected, but coefficients are insignificant. In others the signs are positive but again insignificant except in case of straw board and mill board products where coefficient of COR is significant when related with AE; and in this case R^2 is also relatively high.

The exercise was also attempted with COR, MOR and WOR as independent variables explaining AU and AE (Table V - 7). Some improvement was noticed in the results to the extent that the explanatory power of the model increased in most of the equations and also variables were found to have significant coefficient in a substantial number of cases. But so far as the overall all-industry equation is concerned not much improvement was noticed in the explanatory power

Table V - 6
COR AND NEW INDUSTRIAL ACTIVITY

					R^2
1. All Industry	1. AU = 668.57 - 697.93	C		0.0877	
			(1.35)		
	2. AE = 18004.05 - 14568.14	C		0.00926	
			(0.42)		
2. Industry 205.3	1. AU = 12.6353 - 12.7965	C		0.0402	
			(0.5414)		
	2. AE = 334.2923 - 370.2244	C		0.0770	
			(0.7642)		
3. Industry 211.0	1. AU = 4.4034 - 1.6064	C		0.0007	
			(0.0816)		
	2. AE = -817.3647 + 932.4022	C		0.0251	
			(0.4822)		
4. Industry 280.5	1. AU = -27.8515 + 40.6478	C		0.1546	
			(0.9562)		
	2. AE = -3969.3152 + 5196.9563	C		0.5377	
			(2.4116)**		
5. Industry 329.1	1. AU = -1.8227 + 3.1883	C		0.0125	
			(0.2517)		
	2. AE = -227.8201 + 313.424	C		0.079	
			(0.6552)		
6. Industry 331.1	1. AU = -28.0367 + 56.6278	C		0.0284	
			(0.6403)		
	2. AE = -1543.0345 + 2768.0622	C		0.0139	
			(0.8453)		
7. Industry 340.3	1. AU = 137.1521 - 118.1806	C		0.0108	
			(0.2561)		
	2. AE = 2851.2257 - 1957.1854	C		0.0019	
			(0.1076)		
8. Industry 350.2	1. AU = -117.1622 + 138.0247	C		0.2336	
			(1.2347)		
	2. AE = -16706.2025 + 20606.2546	C		0.2460	
			(1.2772)		

** = Significant at 5%

AU = Additional Units
AE = Additional Employment
C = Cost/Price Ratio

Table V - 7 : RELATIONSHIP OF COST RATIOS WITH NEW INDUSTRIAL ACTIVITY

Industry	Dependent Variable	Constant	Coefficients of					R ²
			COR	MOR				
1	2	3	4	5	6	7		
1. All	AU	+ 807.5125	- 1117.1341 (2.16373)**	+ 357.2200 (1.24796)	- 302.0297 (0.49567)		.0928	
	AE	28551.9477	-66342.8685 (1.9197)**	+46200.9158 (2.5762)**	+23222.1872 (0.5843)		.1480	
2. 205.3	AU	- 12.9369	+60.8271 (2.5938)**	- 39.7567 (2.2009)**	- 66.5752 (4.3916)*		.2371	
	AE	- 325.3642	+1542.9626 (3.18489)**	-1041.7731 (2.7727)**	-1729.5686 (5.7429)*		.3778	
3. 211.0	AU	- 0.467	- 10.9539 (0.5566)	+ 19.8123 (1.4150)	- 43.742 (0.9884)		.2863	
	AE	199.2855	-4705.1065 (2.4333)**	+4589.778 (3.4409)*	11604.0395 (2.5903)**		.6336	
4. 280.5	AU	- 15.8281	+ 84.5459 (1.9889)	- 65.0068 (2.6850)**	- 86.5872 (1.8837)		.7057	
	AE	-3862.3727	+5748.9371 (2.6678)**	- 668.3264 (0.3719)	-1323.3215 (0.4219)		.5536	
5. 329.1	AU	0.6744	+ 1.5394 (0.1215)	+ 4.9022 (0.6052)	- 32.1252 (1.5824)		.4846	
	AE	- 161.478	+1115.4028 (2.3317)**	- 652.2961 (1.8941)	+2506.6754 (2.9507)**		.5257	

RELATIONSHIP OF COST RATIOS WITH NEW INDUSTRIAL ACTIVITY
(contd....)

	1	2	3	4	5	6	7
6.	331.1	AU	- 37.6026	- 11.6437 (0.1316)	+ 74.6264 (1.2459)	- 177.4084 (1.6441)	.1084
		AE	-2605.4633	-1213.1106 (0.1951)	+4273.3435 (1.0245)	-15403.572 (2.1424)***	.1672
7.	340.3	AU	- 842.1569	+4375.2445 (9.4825)*	-3477.5558 (14.9791)*	-4605.6742 (10.5920)*	.8795
8.	350.2	AE	-37585.9384	+178860.359 (9.8365)*	-139479.608 (15.5643)*	-177073.068 (10.36)*	.9044
		AU	- 23.876	+ 114.19 (1.0215)	- 58.875 (0.7341)	- 299.8415 (1.4494)	.3492
		AE	-2135.512	+2948.206 (0.1798)	+7759.411 (0.9066)	-40951.358 (1.8797)**	.6438

NB : Figures in brackets are 't' values of the regression coefficients

* = Significant at 1%; ** = Significant at 5%; *** = Significant at 10%

AU = Additional Units; AE = Additional Employment

COR = Cost-Output Ratio; Material Output Ratio; WOR = Wages to output ratio

of the model but COR showed a significant relationship in expected direction with both AU and AE, though MOR also showed such a relationship with AE but in the unexpected direction. The equations for bakery and milk product yielded improved R^2 and significance for coefficients of all variables; but while MOR and WOR showed relationship in the expected direction, COR yielded a relationships contrary to the ~~p~~^estulated one. Similar results/^{were}~~are~~ yielded by the estimates for industry group nuts, bolts and metal containers. In case of oil and grain mill products the cost ratios revealed a significant relationship with high explanatory power with AE only; COR showed expected but MOR and WOR unexpected signs of the coefficients. In case of straw board and mill board both the equations revealed a reasonably high explanatory power of the model, MOR also showed expected and significant relationship with AU, but with AE, COR showed an unexpected but significant relationship.

In the case of cement and hume pipes, new factories showed no relationship with any of the cost ratios, additional employment was found to be related with COR and WOR but in a positive direction which is difficult to

explain. In casting and forging the situation is more comprehensible, AU is not found related significantly with cost ratios; but AE is found to be negatively and significantly ^{related} with WOR. In agricultural implements, new employment is found negatively related with the wage-output ratio only.

The results do not enable us to come to definite conclusions regarding the influence of total cost, raw material and wages on location. It, however, looks that when COR is found to significantly contribute to the inter-district variation in new industrial activity, MOR and WOR do not; and when former does not the latter do. In all-industry and grain and oil mill products the former situation prevails. It looks the variables relating to the price of output and market rather than raw material or labour cost seem to weigh more in general in these cases. But in a number of other industries, the entrepreneurs seem to get influenced by partial factors like raw material and wage costs in locating or expanding their factories, bakery and milk products, straw and mill board, cement and hume pipes, bolts nuts and metal containers, and the agricultural implements are such industry group. Among them

also, agricultural implements and cement and hume pipes units have a particular influence of wage cost on their location.

To some extent, the relationships could be rather blurred on account of the statistical and data problems. As mentioned earlier, prices and rates of cost variables could probably provide more direct perception of relative advantage than cost-output ratios, to the entrepreneurs. Further in the analysis using all the cost ratios, the relationships could also get diffused to the extent MOR and WOR ^{are} ~~as~~ components of COR, and therefore, may be strongly related with it.

But it is quite likely that the results of our analysis, in fact, reflect the actual position. In the first instance, it may be argued that the entrepreneurs have only a vague idea of locational advantages of a place in terms of one or a few signals; and therefore, their assessment may not be very realistic. We have seen that given the fact that in most cases significant variations in COR are not observed across most of the districts, the personal factors such as domicile of the entrepreneur becomes the

deciding factor in location; and in such a situation a consistent relationship between the slight variations in COR, or its components and new location is highly unlikely to be obtained. Further even if the entrepreneurs' assessment is realistic at a given point of time, the changing input and product market situation may prove the assessment wrong. The cost situation depicted in the analysis relates to the present, while locations have been effected in the past; and therefore, a consistent influence of the former on latter is difficult to find. Another point to be noted is the presence of certain constraints on location and expansion despite the advantage reflected in low COR. Even if the COR turns out quite low in some locations, space may not be available to start new factories or expand old ones. In sum, while one would expect new industrial activity to go more in locations which offer low COR, a number of intangible and non-measurable variables seem to lead to a pattern of location different from expected on this basis. And this seems to have happened to a large extent in the case of industrial activity started in Uttar Pradesh during 1960-75.

Chapter VI

INSTITUTIONAL FACILITIES AND INCENTIVES

A number of facilities are offered by public institutions with a view to accelerating industrial development in general, and also for attracting industries to the backward areas. These facilities include the entire range of services from procuring of land, construction of sheds, assistance in the procurement of plant and machinery, feasibility studies and market surveys, ~~to financing~~^{to} fixed and working capital as well as help in marketing the product. Several specialised institutions such as U.P. State Industrial Development Corporation (UPSIDC), U.P. Small Industries Corporation (UPSIC), U.P. Finance Corporation (UPFC), Pradeshiya Industrial Investment Corporation of Uttar Pradesh (PICUP), to name a few, have been created to provide the various kinds of facilities to the industries, particularly to the new ones. Besides, the State Government also assists industries directly under State Aid to Industries' Act, through the Directorate of Industries and its district offices.

While all these facilities are generally available to industries irrespective of their location, some additional incentives are also available to industries, in their start-up or expansion in the district declared industrially backward. For example, the UPSIC offers 51 per cent participation in equity of the new ventures in these districts initially; rates of interest on loans from UPFC, PICUP etc. are lower in these districts, and so is the underwriting commission for issues relating to the ventured in backward districts; new industries are exempted from octroi duty for 5 years; income tax rebate to the extent of 20 per cent is granted to units in these districts; exemption on sales tax on certain specified raw materials is granted for 5 years in these districts as against 3 years in other districts. Besides the Sales Tax refund scheme providing for interest-free loan of amount equivalent to sales tax of new units is more liberal in backward districts than in others. Sales tax is refunded as loan for 5 years in their case as compared to 3 years in other cases, and repayment of loan starts after 12 years in their case while for others it starts after 10 years. Then there is a Central capital subsidy in a few

specially backward districts and transport subsidies for units located in hilly areas. The commercial banks also offer loans at concessional rates to units in backward districts, either on their own or under refining ^{and} arrangement with IDBI.

Extent/Availment of Facilities

Facilities commonly available in all districts would not make any differential impact on location of new industrial activities. Still it may be worthwhile to examine the extent to which the factories are availing of these facilities in general and in backward districts in particular. In the sample of factories covered in our study, over half (53%) units reported as having used one facility or the other offered by promotional and financial institutions. Assistance in the procurement of plant and machinery was found as the most often used facility; it consisted ² of two types of assistance, procurement under hire purchase scheme available to SSI units from UPSIC in some cases, and more often, financial assistance from institutions and banks as term loan for purchase of machinery. Financial assistance seems to be the most often availed facility, as the next most frequently used assistance

is in the form of loans for meeting working capital requirements. Of the other kinds of facilities, land and infrastructure, mostly under the Industrial Estates Programme, emerges as most important, followed by assistance in the procurement of raw material.

The percentage of units availing institutional facility of one kind or the other falls short of 50 in Kanpur, Agra, Saharanpur, Dehradun, Allahabad, Nainital, Bareilly and Unnao. On the other hand, over two-thirds of the units in Lucknow, Muzaffarnagar, Bulandshahr, Mathura and Sitapur have taken advantage of assistance of some kind or the other. None of the sampled units in Nainital and Dehradun reported having availed of any facilities. Assistance in procurement of plant and machinery is the most often availed facility in most of the districts; 23 per cent of the sampled units availed it in aggregate, but the percentage of such units was over 40 in Ghaziabad, Bijnor, Saharanpur, Muzaffarnagar, Bulandshahr and Gorakhpur. Facility relating to land was availed by a sizeable proportion of units in Ghaziabad, Meerut, and Bijnor. Help in procuring raw material was availed by a good proportion of units in Varanasi, and Jaunpur. The extent

of availment of facilities does not differ in a pattern between the developed and backward districts, but it looks that units located nearer the important regional centres of the institutions could avail the facilities much more than these located in somewhat removed from these centres.

Commercial banks top list of assisting institutions obviously because finance, for short and long term purposes, has been availed of by the largest number of units. In the same vein, the next most often used institution as a source of assistance is U.P. Financial Corporation having assisted 13 per cent of units in the sample, closely followed by U.P.S.I.D.C. which helped 11 per cent of them. Seven per cent of units also received assistance from Directorate of Industries, of the State government; another 3 per cent from NSIC and one per cent from PICUP. Commercial bank finance has been availed of by factories in all industry groups except repair of motor vehicles, but it has been used ^{more often} by units in oil and grain mill products, cycle tyres and tubes, glass products, cement and hume pipes, steel pipes and metal utensils. U.P.F.C. assistance has gone most often to china-ware, nuts bolts and metal containers and basic industrial chemicals, UPSIDC help has been availed most often by units in metal

utensils; and units in casting and forging and manufacture of light agriculture machinery and equipment have received assistance from Directorate of Industries, more often than factories in other industry groups.

Factories in Kanpur, Agra, Meerut, Ghaziabad, Lucknow, Saharanpur, Moradabad, Muzaffarnagar, Aligarh, Mirzapur, Bareilly, Mathura, Jaunpur, Unnao and Sitapur use bank finance more often than ^{those} ~~there~~ in Varanasi, Bijnor, Allahabad, Bulandshahr, and Gorakhpur. UPFC assistance has been used most by units in Bulandshahr, followed by those in Kanpur, Muzaffarnagar and Varanasi. UPSIDC help has gone most often to units in Ghaziabad, Kanpur, Gorakhpur and Agra. Directorate of Industries has been directly helpful most in Varanasi, Agra, Aligarh, Lucknow and Jaunpur; National Small Industries Corporation (NSIC) in Gorakhpur, Kanpur and Ghaziabad and PICUP in Varanasi, Bijnor and Aligarh.

Facilities and Location

It looks that the facilities themselves were not very important in location decisions, as of the 218 occasions of availment of facilities as many as 135 cases were after the establishment and only 83 at the time of establishment.

In Ghaziabad, Bulandshahr, Agra, Meerut, Lucknow and Saharanpur, however, at least 40 per cent cases of availment of facilities were at the time of starting the factory; and therefore, the availability of facilities might have had some influence on location. It may be noted that of these only two, Ghaziabad and Bulandshahr are in the category of backward districts and in each of these districts, over 50 per cent units availed of facilities at the time of establishment. In these cases, one can presume that special facilities and incentives available for backward districts did have some influence on the entrepreneurs' decision on location.

In order that the facilities offered by promotional and financial institutions could influence entrepreneurs' decisions on location, it is necessary that the facilities differ from one location to another and entrepreneurs have knowledge about them. As mentioned earlier, a number of facilities are offered to all entrepreneurs in the State irrespective of their location; but these facilities are available on more favourable terms in 40 such districts in the State which are declared industrially backward; and there are a few other incentives available to units in these districts only.

As has been seen earlier in Chapter 2, the new industrial activity has gone to the backward districts to a less than proportional extent, implying that the differential concessions have not been effective in diverting location to backward districts. Some of the backward districts did get a fair share of new activity, but it is primarily on account of the geographical situation of these districts; they are in proximity of the industrially better developed districts. It therefore looks that the incentives have had effect only in already more advantageously located areas. The incentives could thus be a necessary condition for locational diversification of industries, but they fail to be a sufficient condition as well. The infra-structure and agglomeration factors have a greater pull for attracting industries in a location, and the given nature and extent of incentives cannot substitute these factors in the backward districts.

Still, one can surmise that greater dis-semination of knowledge and awareness of the available incentives could be of some help. We find that there is a significant lack of awareness among entrepreneurs in regard with the facilities available in general, and those available in the backward

, in particular
 districts. About 18 per cent of them are not aware of any of the facilities (Table VI - 1). It is possible that entrepreneurs in non-backward districts did not bother to know about the facilities particularly available in the backward districts. But it is surprising that quite a few entrepreneurs in districts in which these facilities are available were also not aware of any facility and some were aware of a few facilities but unaware of others. For example, over one-third of entrepreneurs in Bulandshahr, a backward district did not know of any of the facilities. Among developed districts, Kanpur entrepreneurs' showed the greatest degree of ignorance of the facilities available in backward districts, 31 per cent of Kanpur entrepreneurs were unaware of any such facilities. Probably Kanpur is already fixed in their mind as the ideal location and they never considered the relative advantages or ^{dis-}advantages of alternative locations.

Of the various facilities and concessions, sales tax refund loan, administered by PICUP seems to be the most publicised : 53 per cent of the entrepreneurs in the sample were aware of it, although all of them could not avail of it as many old units were not eligible for this facility.

Table - VI - 1
Awareness of Various Facilities

	Varanasi	Kanpur	Agra	Meerut	Ghaziabad	Lucknow	Bijnor	Saharanpur	Dehra Dun	Moradabad	Muzaffar-nagar	Aligarh	Allahabad	Mirzapur	Nainital	Bareilly	Buland-shahr	Mathura	Jaunpur	Gorakhpur	Unnao	Sitapur	
Central Capital Subsidy	9	9	-	2	11	3	-	-	-	2	-	1	3	2	3	-	1	-	2	6	1	-	55
Sales Tax Refund	7	19	21	4	26	4	3	12	-	10	4	10	6	1	2	6	6	5	-	2	4	4	156
Equity Participation	2	16	10	2	19	2	3	4	-	3	4	5	6	2	2	4	2	3	2	2	4	3	100
Lower Underwriting Commissions	5	10	5	2	12	4	-	1	-	3	3	4	4	2	-	2	4	1	-	-	3	2	67
Income Tax Rebate	9	15	17	2	19	4	2	8	-	11	4	7	10	2	1	6	9	4	-	1	4	4	139
Lower Rate of Interest on Term Loan	17	20	13	3	21	7	1	6	-	3	5	4	9	3	1	2	6	3	2	6	7	3	142
Transport Subsidy	-	7	1	-	7	2	-	1	1	-	1	2	1	-	1	3	-	-	-	-	-	-	27
Sales Tax Exemption	16	23	9	2	17	4	2	7	-	3	6	5	8	3	3	3	8	3	2	1	6	4	135
Exemption from Electricity Duty	12	16	3	-	16	3	-	1	-	6	4	-	2	4	-	2	4	-	3	1	4	2	83
Lower Earnest Money Service Charge, etc.	8	16	1	-	8	5	-	-	-	1	2	2	6	3	-	-	-	-	2	-	2	1	57
Units not aware of any Facility	-	16	4	-	5	-	-	3	1	2	1	4	1	-	-	3	6	-	-	3	2	1	52
No. of Units in the Sample	20	51	30	6	36	6	4	16	2	16	7	16	12	4	3	10	17	5	3	10	9	3	292

But still it is surprising that such a facility which gives substantial financial assistance, equivalent to three years' sales tax in developed and five-years' sales tax in backward districts free of interest for 10-12 years, is not known to a large number of entrepreneurs. Around half the entrepreneurs are aware of the following facilities to units in backward districts : lower interest rates on term loans, income tax rebate and sales tax exemption; and over one-third know about equity participation by public institutions. Even here a significant proportion of units in backward districts do not know about these facilities. Even the facility of exemption from electricity duty is unknown to a significant number of entrepreneurs. We have no district in the sample in which units are eligible for central capital subsidy; still 19 per cent entrepreneurs know about it. Similarly some entrepreneurs far away from the hills also know about the transport subsidy; most of those located in Dehradun and Nainital, of course, certainly are fully aware of it.

Adequacy and Relative Importance of Incentive

In over three-fourths cases entrepreneurs of factories located in developed districts' were aware of the concessions and incentives available for locating industrial activity in

the backward districts. Why did they not locate factories in backward districts? Of course, 32 per cent of them were already established before the incentives started operating, or they came to know about them (Table VI - 2). But 47 per cent of them just did not bother, probably either because they had other reasons for locating their factories where they are or then, thought that incentives offer no special advantage over what they have at location of their choice. It is found 28 per cent had personal preference for their present location; and 12 per cent considered the procedure of availing the incentives very cumbersome and time consuming. That the incentives were inadequate was offered as an explanation by a sizeable number of units in Varanasi and Lucknow; most Kanpur units were already established but of the newly established ones most did not bother and had personal preferences for Kanpur. Most of the entrepreneurs in Agra, Saharanpur, Bareilly and Aligarh just did not bother about the proposition of locating in backward districts despite incentives.

The factories located in backward districts, as expected, were better aware of the facilities and incentives available to them. Fifty five per cent of them were already located before the incentives started operating; each one of the rest

Table VI : 2

Reasons for not Locating in Backward Districts
(Units in non-backward districts only)

Reasons	Varanasi	Kanpur	Agra	Meerut	Lucknow	Bijnor	Saharanpur	Dehradun	Muzaffarnagar	Aligarh	Allahabad	Mirzapur	Nainital	Bareilly	Gorakhpur	Total
Did not bother	10	5	25	1	4	2	9	2	-	11	6	1	-	6	3	85
Already Established	9	27	5	1	1	-	3	-	-	-	2	4	2	-	4	58
Personal Preference	14	10	1	1	2	-	4	-	1	3	6	3	-	2	3	50
Inadequate assistance	10	-	-	-	2	-	-	-	-	-	-	1	1	-	-	14
Cumbersome and time consuming procedure	10	1	-	2	1	-	1	-	-	-	1	2	-	1	3	22
Any other	4	8	-	4	2	-	1	-	-	-	1	-	-	-	-	20
Total	57	51	31	9	12	2	18	2	1	14	16	11	3	9	13	249
Total number of units in each district	20	51	31	6	8	4	16	2	7	18	12	4	3	10	10	202
No. of units Responding	20	47	31	5	8	2	15	1	1	15	12	4	3	9	7	180

considered some incentive or the other as an important consideration for deciding to locate in a backward district. Different incentives were obviously ^{not} given the same importance. In terms of the importance the entrepreneurs attached to them, the various facilities availed by them could be ranked as follows:

1. Income Tax Rebate,
2. Exemption from sales tax,
3. Sales tax refund loan,
4. Lower rates of interest on term loan by UPFC,
5. Equity participation by UPFC,
6. Lower underwriting commission,
7. Exemption from electricity duty,
8. Transport subsidy, and
9. Lower earnest money.

It appears that the 'directness' of a benefit rather than the quantum and long-term usefulness weighs more with the entrepreneurs in assessing relative importance of incentives. Thus fiscal incentives, in terms of tax concession are upper most in their mind, even though the magnitude of benefit on this account may be less than the interest free term loans granted under sales tax refund loan scheme.

Assistance that goes to reduce cost or make necessary inputs readily available seems less important than tax exemption on produced output or earned income. This ^{Si}proposition is further strengthened by the pattern of suggestions that the entrepreneurs gave for improvement in the system of assistance from public institutions. In the first instance they were rather vague in their responses; only about one-third of the sampled entrepreneurs, mostly those having availed of some facility, responded. The largest number, 34 per cent, felt that the extent of facilities should be enhanced. Specifically, it meant higher rebate in income tax, and exemption from sales tax for a larger period, followed by lower rate of interest on loans and loans covering a larger proportion of fixed and working capital requirements. A good number of entrepreneurs also suggested that the institutions should help the units in procuring raw materials, a few also felt the need for marketing through the sales depots to be established by the institutions, and another few wanted technical assistance to be extended by institutions wherever needed. In the sphere of administration of facilities, about one-eighth of those responding were specific in suggesting that there should be a single agency administering the various kinds of assistance and facilities, and one-

fifth suggested reduction in paper work and procedures. Some of them felt that the facilities, incentives etc. need to be publicised to a greater extent as many entrepreneurs did not know about them.

Chapter VII

CONCLUSION

The factory sector of industries in Uttar Pradesh has undergone a significant structural change during the last two decades. The modern sector of industries, such as chemicals and engineering has grown relatively fast while the traditional industries such as sugar and textiles have not kept pace with overall industrial development. The share of industries based on raw materials from agriculture, animal husbandry and forestry has declined marginally; that of consumer goods industries based on non-local raw materials has declined significantly; while the capital and intermediate products industries have gained substantially. On the whole, industries with raw material based location declined in relative importance while foot-loose industries increased their share substantially. This change has made the State's industrial structure locationally more diversifiable.

Trends in Diversification

In fact, however, the overall spatial structure of industries remained as concentrated in 1975 as it was in 1960. The most significant change noticed is that, Kanpur

contributed only 17 per cent of factory employment in 1975 as against 26 per cent in 1960, while Meerut (including Ghaziabad) has 14 per cent of factory employment in 1975 as against 11 per cent in 1960. The five industrially most important districts, Kanpur, Meerut, Lucknow, Agra and Gorakhpur together claimed 57 per cent of factory employment in 1960 and 55 per cent in 1975. The 10 industrially least developed districts of the State claimed 1.10 per cent of factory employment in 1960 while their share declined to 0.56 per cent in 1975. The five regions - Eastern, Central, Western, Bundelkhand and Hill had 20, 37, 38, 2 and 3 per cent of share in factory employment in 1960; and 18, 26, 49, 3 and 3 per cent respectively in 1975. Thus the Central region lost ground heavily while the Western gained. The notified backward districts as a whole also experienced a decline in their share of factory employment from 15 to 13 per cent. The new factories going to the backward districts, also went mainly to such of them which are in the vicinity of industrially better developed districts.

Industrial structure of most of the districts is of a highly 'specialised' nature : only a few industries account for most of industrial activity. Industrial backwardness

and lack of diversified structure are closely associated. Only a few districts, Meerut, Kanpur, Agra, Varanasi, Moradabad, Aligarh and Lucknow have almost as diversified structure as of the State as a whole, and all these districts are industrially better developed. A study of specialisation pattern of districts reveals that certain clusters of inter related industries either already exist; or, there is potential for developing them; and, with proper planning some clusters or the other can be developed in each of the districts. Such existing and potential clusters have been tentatively identified in our analysis. Use of a cluster-approach gets further support from the findings regarding the relationship between the base and incremental industrial activity. The new industrial activity has gone to the districts where the total industrial activity has had relatively high level already; but in an individual industry the new factories and additional employment is not necessarily found to have been located in districts where the units in the same activity already existed; it has at least not gone to various districts in the same proportion. In a significant number cases, the additional activity in an industry has gone to districts more or less in proportion to the existence of another but inter-related industry.

Factors in Location

An exercise to explain inter-district variations in the location of new industrial activity added during 1960-75 in terms of some macro-variables pertaining to level of agricultural development, infrastructure and promotional efforts by the public institutions, suggests that they can produce significant results in combination, but not in isolation of each other. Infrastructure items such as transport network, power consumption and banking facilities also are able to attract new factories in a district only when the district is favourably placed in terms of level of agricultural development, and special efforts are made by State agencies in this regard. The promotional efforts made by the State institutions (UPSIDC, UPFC and PICUP), measured in terms of financial assistance rendered by them to industries in each of the district, however, seem to produce results even independently of the other factors.

The finding implies that these institutions have been and ^{be} can be effective in getting industrial activities located even in districts which are not very favourably placed in terms of general level of economic and infrastructure development.

While the significance of raw material availability and proximity to the market as factors in location cannot be denied their adequacy to explain the location pattern in ~~entirely~~ ^{entirely} is rather doubtful. There are at least two propositions which suggest themselves as promising hypothesis for explaining the locational pattern of new industrial activity. One, as the industrial economy of a region grows, the significance of basic raw material as a locational factor declines due to the emergence and increasing proportion of industries which are not based on the local weight-losing raw material; and the proximity to the final consumption-head also becomes less significant, to the extent, with the emergence of technology involving greater degree of input-output relationship among industries, manufacturing sector itself provides market for an increasing part of its product. Availability of universal intermediaries and infrastructure, and agglomeration emerge as more important factors in location. Second, there appears to be a high degree of indivisibility of the influences produced by different factors in location, they produce results in unison, but in isolation most of them lose significance.

The above conclusion based on the overall analysis of location pattern, gets further support from the findings relating to the entrepreneurs' own assessment of the various factors that influenced their decision on location of their factories. The fact that an overwhelming proportion of entrepreneurs state preference for their native place as a factor in location of their factories, on the face it, suggests as if the enterprise is the most immobile agent of production, and therefore, entrepreneur's personal preference is the deciding factor in location most often. In fact, however, it looks that availability of infrastructure and development of procurement facilities for raw material, have reduced the differences in locational advantages to a great extent, and finding one place almost as good as another, the entrepreneur prefers to be at home. This statement should, however be read in the context of the pattern of location of new factories and employment in the sample. As we have seen most of them are to be found in the districts and locations which are relatively better developed industrially. It must, however, be noted that in most cases the raw material is not produced locally, although it may be procured locally by the manufac-

turers; and most of the output is also not consumed locally, although it may be sold locally. Therefore, when the entrepreneurs gave importance to the proximity to the raw material source or the market, what in fact is implied is the availability of arrangements for procuring the material and selling the product locally. And existence of these arrangements is primarily a function of the level, concentration and agglomeration of industrial activity on the one hand, and availability of infrastructure on the other, both of which are mostly found to go together.

The entrepreneurs' preference for his native place is, therefore, not absolute; the general assessment of the place as a suitable location on economic grounds works behind his decision. That is probably the reason as to why despite a heavy weight of seemingly personal non-economic consideration in the location of factories the entrepreneurs have not faced many location specific problems in their operations. The problems they face are mostly of general nature common to all locations in the State. The most often reported problem has been that of availability of power which affected units in all locations more or less to a similar extent.

Comparative Advantage of Different Locations

In terms of costs and realised value of output differences are not found very wide in most cases, though in some, mostly raw material based industries, the range of cost to output ratio (COR) is rather wide reflecting the variations in the price of raw material. Comparative cost advantage, however marginal, may theoretically be expected to get reflected in location pattern, but we do not find strong evidence of such a relationship. The entrepreneurs' assessment is thus either based on some broad indicators, such as the fact that quite a few units are already doing well in a location. Very precise cost estimates of each of the inputs and the likely price of the product do not seem to get considered in each and every location decision. It may also be noted that many a time the marginal differences in cost and market situation as assessed by the entrepreneur are outweighed by ~~the~~ ~~the~~ the personal preference for the native place.

The CORs inevitably point to some least cost or most advantageous location. But what is significant to note is that in no industry we find just one such location, going

away from which increase the disadvantage in proportion to distance. There are found to be two or three ~~best~~ most advantageous location (MAL) points, usually one in each region, Eastern, Western and Central regions of the State. Within the region the advantage tends to generally decline with distance from that point. This finding suggests that for planning industrial development of the State, and for devising incentive schemes to attract industries to backward areas, a regional approach is necessary, as the space does not remain a continuous variable across the entire State; but it does behave that way in a given region. Incentives in backward districts in a region could also be related with the disadvantage a district offers in relation to the MAL point in that region; and of course, the compensation by way of subsidies and incentives have to be proportionate to the degree of disadvantage measured in terms of the difference of COR in a location over that in the most advantageous location. To the extent the COR moves in line with the distance from the MAL, distance in space itself can make the basis for grading the incentives and subsidies.

Incentives for Backward Area Location

The existing incentives and other forms of assistance are not so graded as to provide differential benefit in proportion to the degree of disadvantage of a location. But units in all the backward districts are provided with a uniformly higher degree of concessions by way of these incentives. The impact of these incentives seem limited for various reasons. Many entrepreneurs are not even aware of the existence of these facilities; many of those aware of them do not consider the incentives adequate to compensate them for the disadvantage of going to a backward rather than a non-backward districts, and some feel that procedure for availing the stipulated assistance is rather cumbersome and time-consuming. Yet quite a few entrepreneurs decided to locate their units in a backward district due to the availability of some incentives. But most of them give highest importance to tax concessions; assistance which reduces cost of their output directly is not as popular as the fiscal incentives based on the final product or income.

Conclusion

It is, however, quite clear that incentives, fiscal or financial as in existence, play only a marginal role in the diversification of industries. All evidence points to the fact that infrastructure and agglomeration have emerged as the major determinants of location overshadowing the importance of the location of raw materials and markets, the disadvantages on account of which could be compensated to some extent by incentives. For diversification of industries, today, even infrastructure does not seem the major bottleneck except in remote and highly backward areas. What needs to be recognised squarely is that industries survive and grow where other, particularly inter-related industries exist. Providing incentives to attract one or a few units in unrelated branches of industry is highly unlikely to succeed in developing the area industrially. Planning of development of industries mutually supporting each other and using and providing certain common facilities for the promotion of skills, entrepreneurial training, economy in raw material procurement and marketing would alone prove effective in industrial develop-

ment of backward areas. Findings of our study have provided substantial evidence to this effect as well some guidelines for the direction in which action needs to be taken in various regions of the State of Uttar Pradesh.

Such an approach is, however, not feasible for application in all areas simultaneously. It may not even be economically desirable, due to the reasons of the immediate high costs, to plan for rapid industrialisation of the most backward and remote areas lacking even the minimum infrastructure. The most practical method seems to be to use the regional growth points which have already developed in each region of the State as the focal points and plan, in the first instance development of industries related with those operating in the most advantageous locations as identified earlier, in the areas and districts in ^{their} ~~the~~ proximity; and then gradually move to greater distance and more backward areas, shifting the focal point to the newly developed areas in the process. This process, besides being economically practicable in the short run, will alone prove effective in industrial development of backward areas in the long run.

Appendix Table : 1

Factories and Factory Employment in U.P. : 1960 and 1975
(by industry groups)

Sl. No.	Indu- stry Groups	1960		1975		Addition (1960-75)	
		Units	Employment	Units	Employment	Units	Employment
1	2	3	4	5	6	7	8
1.	010	16 (0.65)	498 (0.18)	1 (0.02)	18 (0.00)	-15 (-0.74)	-480 (-0.38)
2.	202	7 (0.28)	383 (0.14)	14 (0.31)	4100 (1.04)	7 (0.34)	3717 (2.98)
3.	203	14 (0.57)	621 (0.23)	12 (0.27)	778 (3.20)	-2 (-0.10)	157 (0.13)
4.	205	262 (10.60)	4929 (1.83)	233 (5.18)	4141 (1.05)	-29 (-1.43)	-788 (-0.63)
5.	206	7 (0.28)	276 (0.10)	34 (0.75)	963 (0.24)	27 (1.33)	687 (0.55)
6.	207	304 (12.30)	60561 (22.52)	766 (17.02)	79821 (20.29)	462 (22.80)	19260 (15.47)
7.	208	2 (0.08)	86 (0.03)	1 (0.02)	41 (0.01)	-1 (-0.04)	45 (-0.04)
8.	209	138 (5.58)	7931 (2.95)	197 (4.38)	8029 (2.04)	59 (0.91)	98 (0.08)
9.	211	15 (0.61)	1074 (0.40)	9 (0.20)	1683 (0.43)	-6 (-0.30)	609 (0.49)
10.	212	1 (0.04)	103 (0.04)	1 (0.02)	59 (0.01)	- (-)	-44 (-0.03)
11.	213	-	-	7 (0.15)	1563 (0.40)	7 (0.34)	1563 (1.25)
12.	214	1 (0.04)	34 (0.01)	7 (0.15)	617 (0.16)	6 (0.30)	583 (0.47)
13.	220	7 (0.28)	382 (0.14)	26 (0.58)	11475 (2.92)	19 (0.94)	11093 (8.91)
14.	231	96 (3.88)	63828 (23.73)	184 (4.09)	57776 (14.68)	88 (4.34)	-6052 (-4.86)

Appendix Table : 1 (contd.)

1	2	3	4	5	6	7	8
15.	232	16 (0.65)	665 (0.25)	8 (0.18)	106 (0.03)	-8 (-0.39)	-559 (-0.45)
16.	233	1 (0.04)	196 (0.07)	48 (1.07)	2324 (0.59)	47 (2.31)	2128 (1.71)
17.	239	16 (0.65)	1756 (0.65)	8 (0.18)	91 (0.02)	-8 (-0.39)	-1665 (-1.34)
18.	241	39 (1.58)	3979 (1.48)	27 (0.60)	3928 (0.97)	-12 (-0.60)	-51 (-0.04)
19.	242	1 (0.04)	14 (0.00)	-	-	-1 (-0.05)	-14 (-0.01)
20.	243	2 (0.08)	202 (0.07)	11 (0.24)	300 (0.07)	9 (0.44)	98 (0.08)
21.	250	23 (0.93)	1214 (0.45)	32 (0.71)	1561 (0.40)	9 (0.44)	347 (0.28)
22.	260	12 (0.48)	454 (0.17)	8 (0.18)	250 (0.06)	-4 (-0.20)	-204 (-0.16)
23.	271	14 (0.57)	1586 (0.59)	70 (1.56)	4402 (1.12)	56 (2.76)	2816 (2.26)
24.	280	208 (8.41)	9947 (3.70)	207 (4.60)	17988 (4.57)	-1 (-0.05)	8041 (6.46)
25.	291	81 (1.25)	3218 (1.20)	85 (1.89)	4210 (1.07)	54 (2.66)	992 (0.80)
26.	292	5 (0.20)	166 (0.06)	-	-	-5 (-0.25)	-166 (-0.13)
27.	300	5 (0.20)	56 (0.02)	106 (2.35)	4472 (1.10)	101 (4.94)	4416 (3.20)
28.	311	24 (0.97)	2530 (0.94)	109 (2.42)	8706 (2.21)	85 (4.19)	6176 (4.96)
29.	312	1 (0.04)	15 (0.00)	16 (0.35)	600 (0.15)	15 (0.74)	585 (0.47)
30.	319	46 (1.86)	2129 (0.79)	136 (3.02)	6544 (1.66)	90 (4.44)	4415 (3.55)
31.	321	13 (0.52)	189 (0.07)	1 (0.02)	6 (0.00)	-12 (-0.59)	-183 (-0.15)

Appendix Table : 1 (contd.)

1	2	3	4	5	6	7	8
32.	322	2 (0.08)	153 (0.06)	-	-	-2 (-0.10)	-183 (-0.12)
33.	331	4 (0.16)	103 (0.04)	7 (0.15)	229 (0.06)	3 (0.15)	126 (0.10)
34.	332	191 (7.73)	14856 (5.52)	260 (5.78)	37826 (9.61)	69 (3.40)	22970 (18.45)
35.	333	5 (0.20)	268 (0.10)	19 (0.42)	1694 (0.43)	14 (0.69)	1426 (1.14)
36.	334	1 (0.04)	1315 (0.49)	7 (0.15)	2809 (0.71)	6 (0.30)	1494 (1.20)
37.	339	49 (1.98)	1328 (0.04)	49 (1.09)	1282 (0.32)	-	-46 (-0.03)
38.	341	83 (3.36)	5808 (2.16)	423 (9.40)	17828 (4.53)	340 (16.78)	12020 (9.65)
39.	342	29 (1.17)	1124 (0.42)	70 (1.56)	7883 (2.00)	41 (2.02)	6759 (5.43)
40.	350	139 (5.62)	5432 (3.02)	462 (10.27)	14710 (3.74)	323 (15.94)	9278 (7.45)
41.	360	251 (10.15)	13524 (5.03)	267 (5.93)	14704 (3.73)	16 (0.79)	1180 (0.95)
42.	370	17 (0.69)	827 (0.31)	125 (2.78)	9847 (2.50)	108 (5.33)	9020 (7.24)
43.	382	18 (0.73)	25305 (9.41)	18 (0.40)	28712 (7.06)	-	3407 (2.47)
44.	383	1 (0.04)	36 (0.01)	28 (0.62)	4304 (1.09)	27 (1.33)	4268 (3.43)
45.	384	111 (4.49)	13264 (4.93)	157 (3.49)	19443 (4.94)	46 (2.27)	6179 (4.96)
46.	385	15 (0.61)	493 (0.18)	45 (1.00)	2091 (0.53)	30 (1.48)	1598 (1.28)
47.	386	3 (0.12)	208 (0.08)	3 (0.06)	383 (0.10)	-	175 (0.14)
48.	389	8 (0.32)	789 (0.29)	-	-	-8 (-0.39)	-789 (-0.63)

Appendix Table : 1
(contd..)

1	2	3	4	5	6	7	8
49.	391	16 (0.65)	427 (0.16)	32 (0.71)	839 (0.21)	16 (0.79)	412 (0.33)
50.	392	2 (0.08)	25 (0.01)	3 (0.06)	53 (0.01)	1 (0.05)	28 (0.02)
51.	393	8 (0.32)	85 (0.03)	2 (0.04)	547 (0.14)	-6 (0.30)	542 (0.36)
52.	394	1 (0.04)	21 (0.01)	-	-	-1 (-0.50)	-21 (-0.02)
53.	395	16 (0.65)	1388 (0.52)	6 (0.13)	401 (0.10)	-10 (-0.49)	-987 (-0.79)
54.	396	32 (1.29)	2106 (0.78)	20 (0.44)	959 (0.24)	-12 (-0.59)	-1147 (-0.92)
55.	399	60 (2.43)	4486 (1.67)	21 (0.47)	723 (0.18)	-39 (-1.92)	-3763 (-9.02)
56.	511	63 (2.55)	5098 (1.89)	57 (1.27)	10783 (2.65)	-6 (-0.30)	5685 (4.57)
57.	512	3 (0.12)	212 (0.08)	6 (0.13)	130 (0.03)	3 (0.15)	-82 (-0.06)
58.	521	16 (0.65)	1188 (0.44)	55 (1.22)	2012 (0.51)	39 (1.92)	824 (0.66)
59.	522	1 (0.04)	52 (0.02)	-	-	-1 (-0.05)	-52 (-0.04)
60.	844	1 (0.04)	17 (0.01)	11 (0.24)	196 (0.05)	10 (0.50)	179 (0.14)
Total(whole U.P.)		2473	268970	4517	406940	2044	137970

Source : Compiled from the registers maintained by the Chief
Inspector of Factories, U.P., Kanpur.

Appendix Table : 2

Factories and Factory Employment in U.P. in 1960 and 1975

Districts	1960			1975			Addition (1960-75)			Percentage to grand total					
	Units (1)	Employ- ment (2)	Units (3)	Employ- ment (4)	Units (5)	Employ- ment (6)	Units (7)	Employ- ment (8)	Units (9)	(1)	(2)	(3)	(4)	(5)	(6)
Eastern Region															
Allahabad	117	8269	137	13505	20	5236	4.73	3.07	3.03	3.32	0.98	3.80			
Azamgarh	4	323	48	2093	44	1770	0.16	0.12	1.06	0.51	2.15	1.28			
Bahraich	33	1148	29	1051	-4	-97	1.35	0.43	0.64	0.26	-0.19	-0.07			
Ballia	3	67	2	138	-1	71	0.12	0.02	0.04	0.03	-0.05	0.05			
Basti	10	2410	11	2289	1	-121	0.40	0.90	0.24	0.56	0.05	-0.09			
Deoria	20	9330	21	8206	1	-1124	0.81	3.47	0.46	2.02	0.05	-0.81			
Faizabad	15	1387	19	1641	4	254	0.61	0.51	0.42	0.40	0.19	0.18			
Ghazipur	3	674	7	843	4	169	0.12	0.25	0.15	0.21	0.19	0.12			
Gonda	27	2191	21	2711	-6	520	1.09	0.81	0.46	0.67	-0.29	0.38			
Corakhpur	46	14587	64	16003	18	1416	1.86	5.42	1.42	3.93	0.88	1.03			
Jaunpur	10	927	15	618	5	-309	0.40	0.34	0.33	0.15	0.24	-0.22			
Mirzapur	31	3565	46	12355	15	8790	1.25	1.32	1.02	3.04	0.73	6.37			
Pratapgarh	1	36	4	101	3	65	0.04	0.01	0.09	0.02	0.15	0.05			
Sultanpur	2	66	4	150	2	84	0.08	0.02	0.09	0.04	0.10	0.06			
Varanasi	122	7642	195	11267	73	3625	4.93	2.84	4.32	2.77	3.57	2.63			
Total	444	52622	623	72971	179	20349	17.96	19.56	13.79	17.93	8.76	14.75			

[illegible]